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A HISTORY OF THE EARTH AND ANIMATED NATURE.

BY OLIVER GOLDSMITH.

WITH COPIOUS NOTES;

And an Appendix,

CONTAINING EXPLANATIONS OF TECHNICAL TERMS, AND AN OUTLINE OF
THE CUVIERIAN AND OTHER SYSTEMS,

BY

CAPTAIN THOMAS BROWN,

F.L.S., M.W.S., M.K.S.

VOL. III.—PART II.

A. FULLARTON AND CO.,
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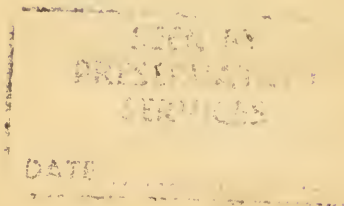
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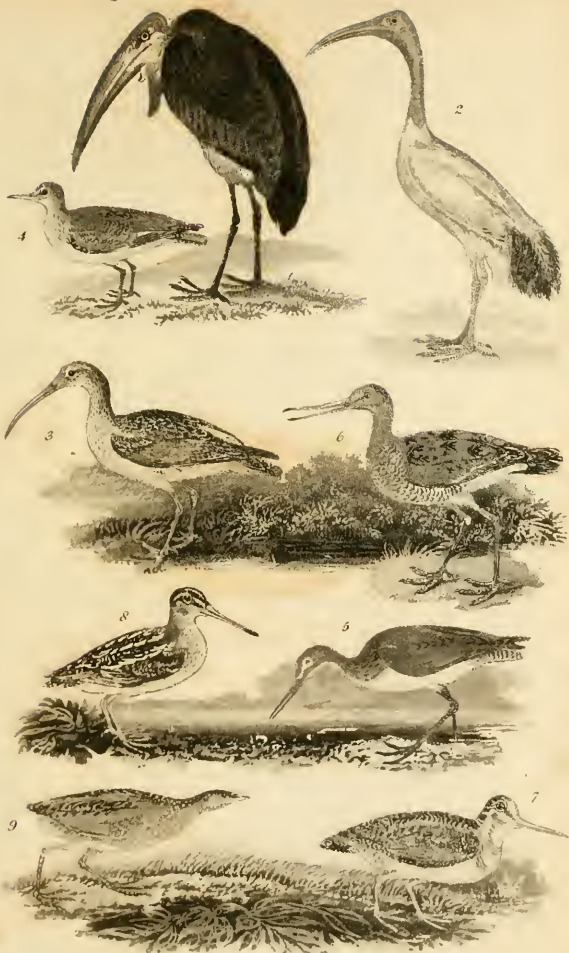
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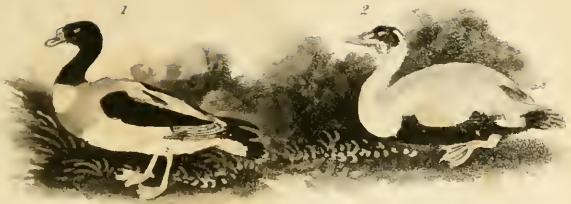
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R. Scott


1 Giant Crane 2 Sacred Ibis 3 Curlew 4 Sandpiper 5 Greenshank
6 Red Godwit 7 Woodcock 8 Common Snipe 9 Sandrail

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1. Sheldrake 2. Elder Duck 3. Gadwall 4. Widgeon 5. Golden Eye
6. Cassin's 7. Teal 8. Pintail

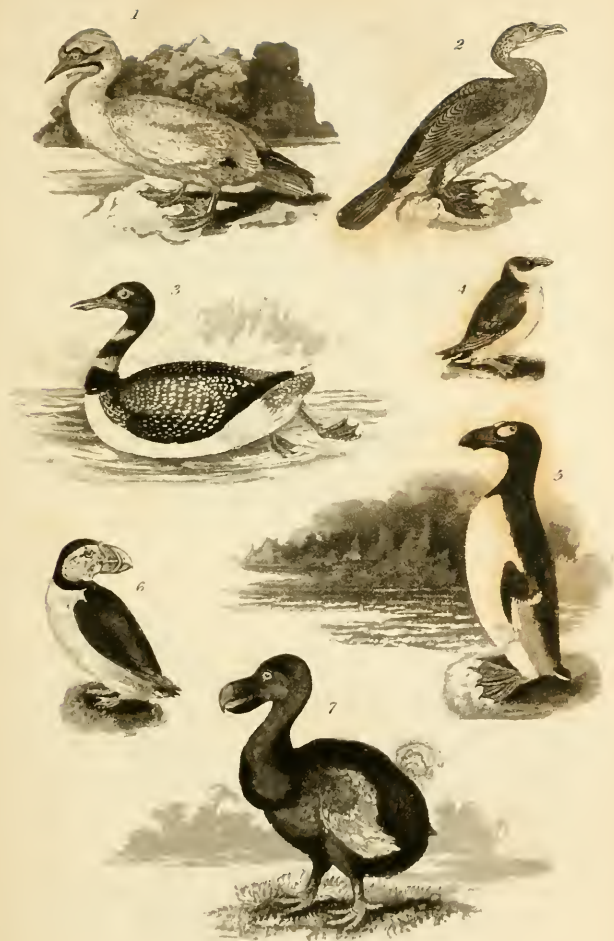


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1 Very crooked Dendrocygna 2 Blue Berry Eater 3 Hooked Eagle 4 Climbing Cuckoo 5 Crested Stork 6 Common Thick Knee 7 Bearded Trichophorus 8 White-fronted Manakin 9 White-winged Gull 10 Hopping Gopher 11 Southern Apteryx 12 Patagonian Penguin.



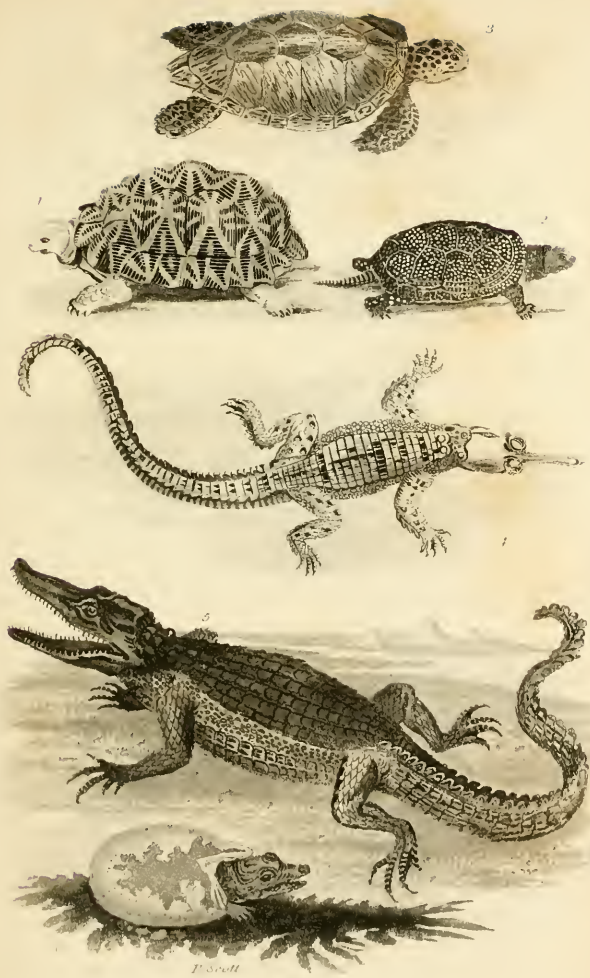


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1 Solan Goose 2 Shag. 3 Great Northern Diver. 4 Little Auk.
 5 Great Auk. 6 Puffin 7 Dodo.

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3



1 Galapagos Tortoise 2 Spotted D^o 3 Green Turtle 4 Gharial 5 crocodile 6 crocodile
D^o crocodile Eng



R. Scott

1 Scalloped Tailed Gecko, 2 Common Chameleon, 3 Common Skink, 4 Blind Worm,
5 Eel Shaped Siren, 6 Great Boa, 7 Banded Rattle Snake.

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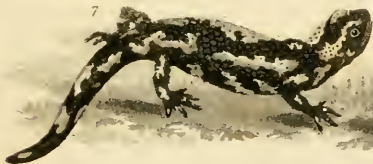
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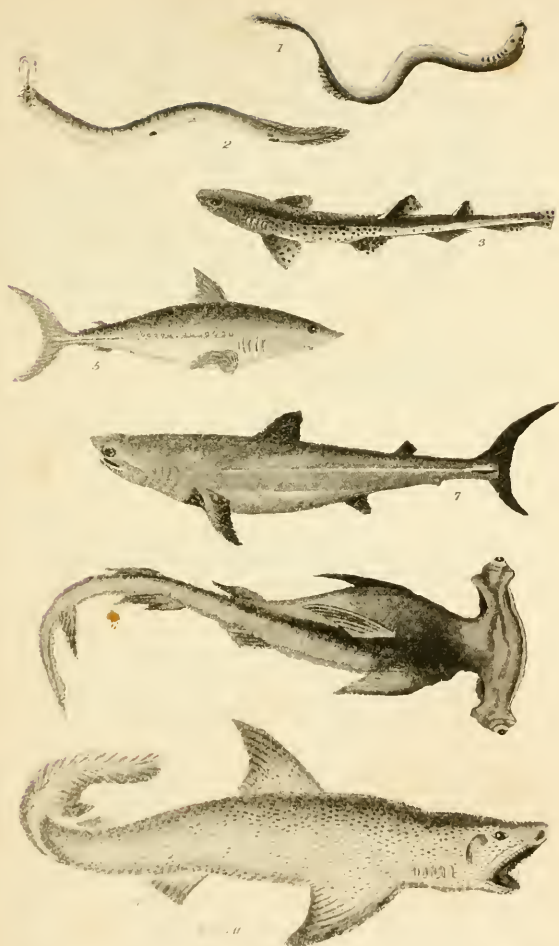


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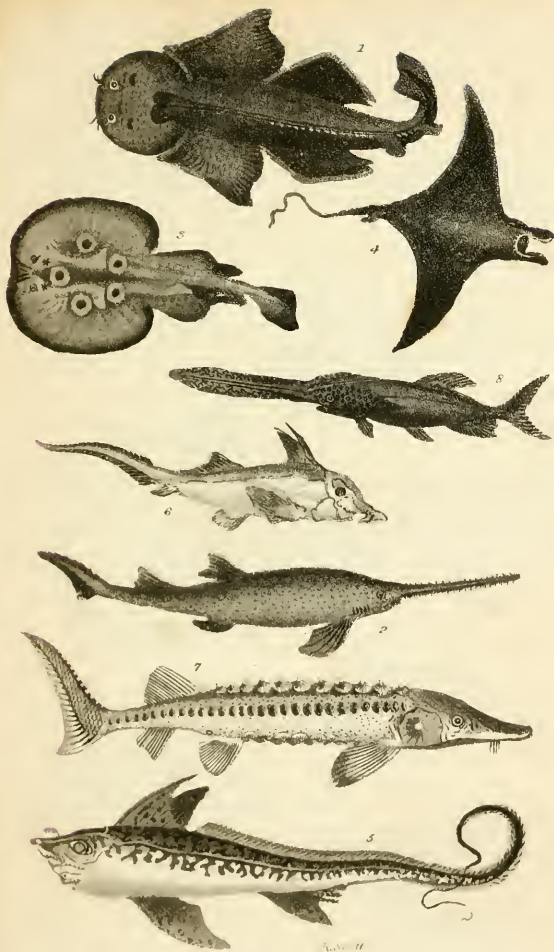
R. Scott

1 Spectacle Snake 2 Eel shaped Cæcilia. 3 Green Frog. 4 Eggs. 5 Tadpoles.
6 Maphitic Toad. 7 Salamander. 8 Surinam Pipa. 9 Water Proteus 10 Horned
Toad. 11 Tree Frog.

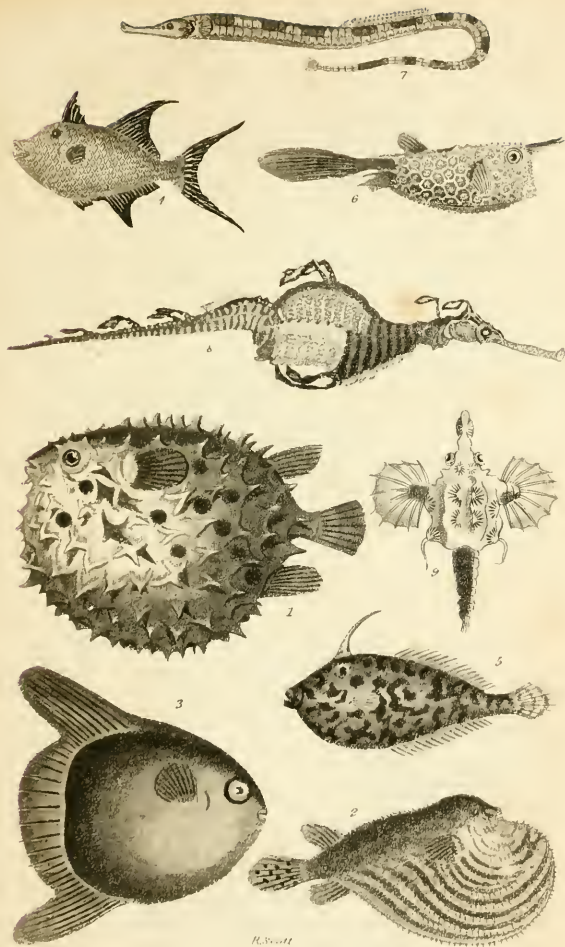


1 Lesser Lamprey 2 Glutinous Lamprey 3 Lesser Salmon 4 Salmon 5 Salmon
6 Hammer Headed D^o 7 Bushing D^o



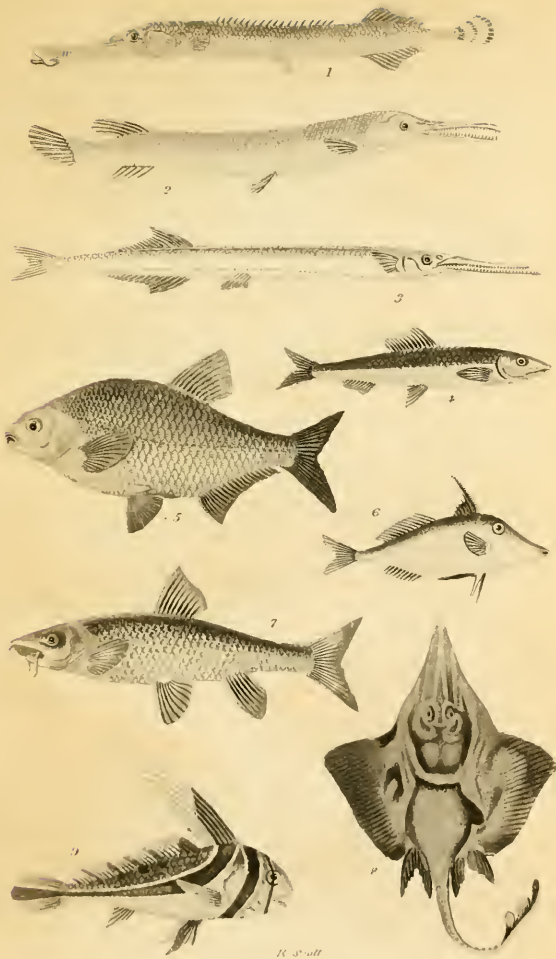


1 Angel Fish 2 Saw Fish 3 Torpedo 4 Demon Ray 5 Northern Chimarra
6 Southern Do 7 Sturgeon 8 Reticulated Spatularia

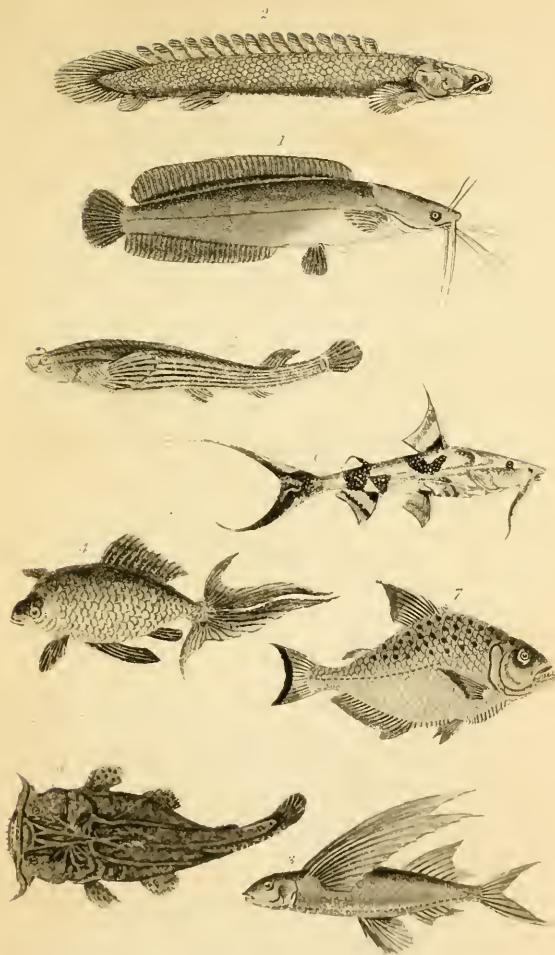


H. Scott

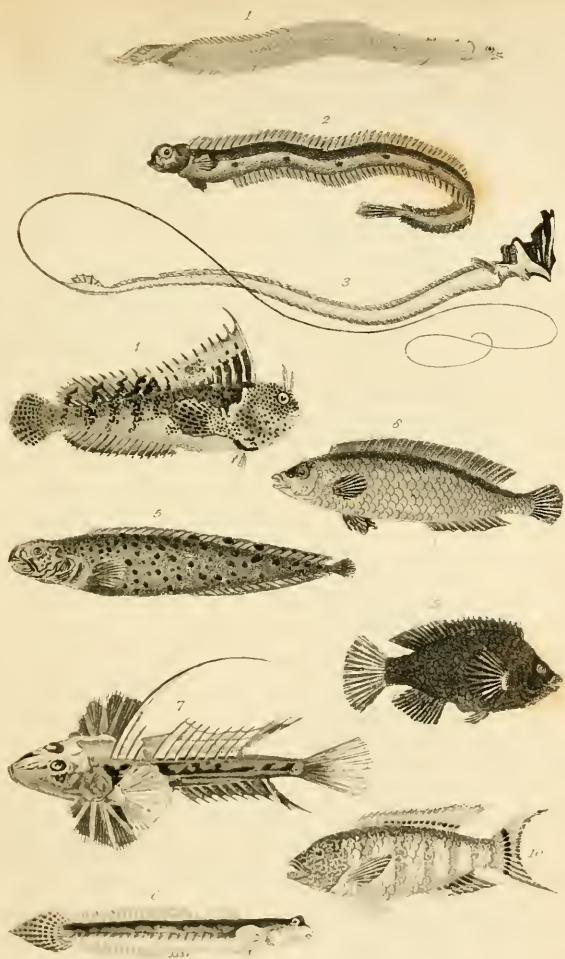
1 Round Diodon 2 Latent Tetradon 3 Short Sun Fish 4 Old Wife or File D^r 5 Unicorn D^r 6 Horned Trunk D^r 7 Great Pipe D^r 8 Australian Pipe D^r 9 Dragon Pegasus



1 Chinese Tobacco Pipe Fish 2 Chinese Gar Fish 3 Sea Pike 4 Anchovy 5 Bream
6 Two Spined File Fish 7 Barbel 8 Sharp Nosed Ray 9 American Knight Fish

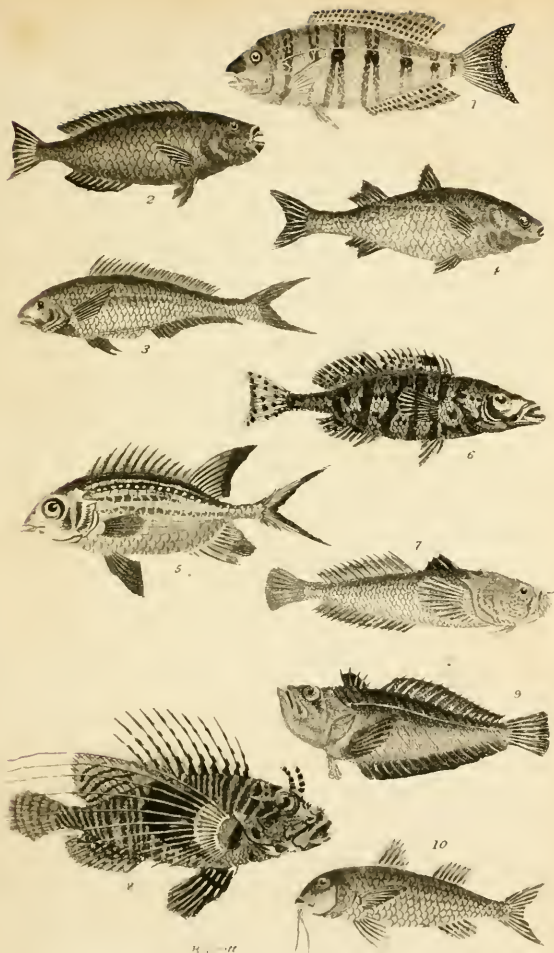


1 *Macropteronotus* 2 *Vitalis Polypterus* 3 *Albino Fish* 4 *Golden Carp* 5 *Star Area*
trachurus 6 *Pomphidus Borealis* 7 *Rhinichthys salmon* 8 *Platypterus Alata*



1 *Leptocarpus* Morrison 2 Band Fish 3 Coarctated *Stylopietis* 4 *Sciaen* 5 *Sciaen*
 6 Wolf Fish 7 *Sciaen* 8 *Sciaen* 9 *Sciaen* 10 Banded Gilt Head





1 Starry Gilt Head 2 Green Scarus 3 Gold Tailed Sparus 4 Tuna 5 Sargo
 Holocentrus 6 Spotted Holocentrus 7 Star Gazer 8 Antennated Scorpaena 9 Dragon
 Weaver 10 Surge wrasse

BOOK VI.

OF BIRDS OF THE CRANE KIND.

CHAP. I.

OF BIRDS OF THE CRANE KIND IN GENERAL.

THE progressions of Nature from one class of beings to another, are always by slow and almost imperceptible degrees. She has peopled the woods and the fields with a variety of the most beautiful birds; and, to leave no part of her extensive territories untenanted, she has stocked the waters with its feathered inhabitants also: she has taken the same care in providing for the wants of her animals in this element, as she has done with respect to those of the other; she has used as much precaution to render water-fowl fit for swimming, as she did in forming land-fowl for flight; she has defended their feathers with a natural oil, and united their toes by a webbed membrane: by which contrivances they have at once security and motion. But between the classes of land-birds that shun the water, and of water-fowl that are made for swimming and living on it, she has formed a very numerous tribe of birds, that seem to partake of a middle nature; that, with divided toes, seemingly fitted to live upon land, are at the same time furnished with appetites that chiefly attach them to the waters. These can properly be called neither land-birds nor water-fowl, as they provide all their sustenance from watery places, and yet are unqualified to seek it in those depths where it is often found in greatest plenty.*

This class of birds, of the crane kind, are to be distinguished

* The term *waders* is now applied to this description of birds. The ostriches, though differing considerably from other families, belong properly to this order.

from others rather by their appetites than their conformation. Yet even in this respect they seem to be sufficiently discriminated by nature : as they are to live among the waters, yet are incapable of swimming in them, most of them have long legs, fitted for wading in shallow waters, or long bills proper for groping in them.

Every bird of this kind, habituated to marshy places, may be known, if not by the length of its legs, at least by the scaly surface of them. Those who have observed the legs of a snipe or a woodcock, will easily perceive my meaning ; and how different the surface of the skin that covers them is from that of the pigeon or the partridge. Most birds of this kind also, are bare of feathers half way up the thigh ; at least, in all of them, above the knee.—Their long habits of wading in the waters, and having their legs continually in moisture, prevents the growth of feathers on those parts ; so that there is a surprising difference between the legs of a crane, naked of feathers almost up to the body, and the falcon, booted almost to the very toes.

The bill is also very distinguishable in most of this class. It is, in general, longer than that of other birds, and in some finely fluted on every side ; while at the point it is possessed of extreme sensibility, and furnished with nerves, for the better feeling their food at the bottom of marshes, where it cannot be seen. Some birds of this class are thus fitted with every convenience ; they have long legs, for wading ; long necks for stooping ; long bills, for searching ; and nervous points, for feeling. Others are not so amply provided for ; as some have long bills, but legs of no great length ; and others have long necks, but very short legs. It is a rule which universally holds, that where the bird's legs are long, the neck is also long in proportion. It would indeed be an incurable defect in the bird's conformation, to be lifted upon stilts above its food, without being furnished with an instrument to reach it.

If we consider the natural power of this class, in a comparative view, they will seem rather inferior to those of every other tribe. Their nests are more simple than those of the sparrow ; and their methods of obtaining food less ingenious than those of the falcon ; the pie exceeds them in cunning ; and though they have all the voraciousness of the poultry tribe, they want their fecundity. None of this kind, therefore, have been taken into

man's society, or under his protection; they are neither caged, like the nightingale; nor kept tame, like the turkey; but lead a life of precarious liberty, in fens and marshes, at the edges of lakes, and along the sea-shore. They all live upon fish or insects, one or two only excepted; even those that are called *mud-suckers*, such as the snipe and the woodcock, it is more than probable, grope the bottom of marshy places only for such insects as are deposited there by their kind, and live in a vermicular state, in pools and splashes, till they take wing, and become flying insects.

All this class, therefore, that are fed upon insects, their food being easily digestible, are good to be eaten; while those who live entirely upon fish, abounding in oil, acquire in their flesh the rancidity of their diet, and are, in general, unfit for our tables. To savages, indeed, and sailors on a long voyage, every thing that has life seems good to be eaten; and we often find them recommending those animals as dainties, which they themselves would spurn at after a course of good living. Nothing is more common in their journals than such accounts as these—"This day we shot a fox—pretty good eating: this day we shot a heron—pretty good eating: and this day we killed a turtle"—which they rank with the heron and the fox, as "pretty good eating." Their accounts, therefore, of the flesh of these birds, are not to be depended upon; and when they cry up the heron or the stork of other countries as luxurious food, we must always attend to the state of their appetites who give the character.

In treating of this class of birds, it will be best to observe the simplest method possible; neither to load the memory with numerous distinctions, nor yet confuse the imagination by a total want of arrangement. I will, therefore, describe some of the larger sorts separately; as, in a history of birds, each of these demands peculiar distinction. The crane, the stork, the Balearic crane, the heron, the bittern, with some others, may require a separate history. Some particular tribes may next offer, that may very naturally be classed together; and as for all the smaller and least remarkable sorts, they may be grouped into one general description.

CHAP. II.

THE CRANE.

THERE is something extraordinary in the different accounts we have of this bird's size and dimensions. Willoughby and Pennant make the crane from five to six feet long, from the tip to the tail. Other accounts say that it is above five feet high; and others, that it is as tall as a man. From the many which I myself had seen, I own this imputed magnitude surprised me; as from memory I was convinced, they could neither be so long nor so tall. Indeed, a bird, the body of which is not larger than that of a turkey-hen, and acknowledged on all hands not to weigh above ten pounds, cannot easily be supposed to be almost as long as an ostrich. Brisson, however, seems to give this bird its real dimensions, when he describes it as something less than the brown stork, about three feet high, and about four from the tip to the tail. Still, however, the numerous testimonies of its superior size are not to be totally rejected; and, perhaps, that from which Brisson took his dimensions, was one of the smallest of the kind.

The crane, taking its dimensions from him, is exactly three feet four inches from the tip to the tail, and four feet from the head to the toe. It is a tall slender bird, with a long neck and long legs. The top of the head is covered with black bristles, and the back of it is bald and red, which sufficiently distinguishes this bird from the stork, to which it is very nearly allied in size and figure. The plumage in general, is ash-coloured; and there are two large tufts of feathers, that spring from the pinion of each wing. These bear a resemblance to hair, and are finely curled at the ends, which the bird has a power of ereeting and depressing at pleasure. Gesner says, that these feathers, in his time, used to be set in gold, and worn as ornaments in caps.

Such are the dimensions of a bird, concerning which, not to mention modern times, there have been more fables propagated than of any other. It is a bird with which all the ancient writers are familiar; and, in describing it, they have not failed to mix imagination with history. From the policy of the cranes, they say, we are to look for an idea of the most perfect republic

amongst ourselves; from their tenderness to their decrepit parents, which they take care to nourish, to cherish, and support when flying, we are to learn lessons of filial piety; but particularly from their conduct in fighting with the pigmies of Ethiopia, we are to receive our maxims in the art of war. In early times, the history of Nature fell to the lot of poets only, and certainly none could describe it so well; but it is a part of their province to embellish also; and when this agreeable science was claimed by a more sober class of people, they were obliged to take the accounts of things as they found them; and, in the present instance, fable ran down blended with truth to posterity.

In these accounts, therefore, there is some foundation of truth; yet much more has been added by fancy. The crane is certainly a very social bird, and they are seldom seen alone. Their usual method of flying or sitting is in flocks of fifty or sixty together; and while a part feed, the rest stand like sentinels upon duty. The fable of their supporting their aged parents, may have arisen from their strict connubial affection; and as for their fighting with the pigmies, it may not be improbable but that they have boldly withstood the invasions of monkeys coming to rob their nests; for in this case, as the crane lives upon vegetables, it is not probable that it would be the first aggressor.

However this be, the crane is a wandering, sociable bird, that, for the most part, subsists upon vegetables; and is known in every country of Europe, except our own. There is no part of the world, says Bellonius, where the fields are cultivated, that the crane does not come in with the husbandman for a share in the harvest. As they are birds of passage, they are seen to depart, and return regularly at those seasons when their provision invites or repels them. They generally leave Europe about the latter end of autumn, and return in the beginning of summer. In the inland parts of the continent, they are seen crossing the country in flocks of fifty or a hundred, making from the northern regions towards the south. In these migrations, however, they are not so resolutely bent upon going forward, but that if a field of corn offers in their way, they will stop awhile to regale upon it: on such occasions they do incredible damage, chiefly in the night; and the husbandman, who lies down in joyful expectation, rises in the morning to see his fields laid entirely waste by an enemy, whose march is too swift for his vengeance to overtake.

Our own country is free from their visits ; not but that they were formerly known in this island, and held in great estimation for the delicacy of their flesh ; there was even a penalty upon such as destroyed their eggs ; but, at present, they never go so far out of their way.* Cultivation and populousness go hand in hand ; and though our fields may offer them a greater plenty, yet it is so guarded that the birds find the venture greater than the enjoyment ; and probably we are much better off by their absence than their company. Whatever their flesh might once have been, when, as Plutarch tells us, cranes were blinded and kept in coops, to be fattened for the tables of the great in Rome ; or, as they were brought up, stuffed with mint and rue, to the tables of our nobles at home ; at present, they are considered all over Europe as wretched eating. The flesh is fibrous and dry, requiring much preparation to make it palatable ; and even after every art, it is fit only for the stomachs of strong and labouring people.

The cold Arctic region seems to be this bird's favourite abode. They come down in the more southern parts of Europe, rather as visitants than inhabitants : yet it is not well known in what manner they portion out their time, to the different parts of the world. The migrations of the fieldfare or thrush, are obvious and well known ; they go northward or southward, in one simple track ; when their food fails them here, they have but one region to go to. But it is otherwise with the crane ; he changes place, like a wanderer : he spends the autumn in Europe ; he then flies off, probably to some more southern climate, to enjoy a part of the winter ; returns to Europe in the spring ; crosses up to the north in summer ; visits those lakes that are never dry ; and then comes down again, to make depredations upon our cultivated grounds, in autumn. Thus, Gesner assures us, that the cranes usually begin to quit Germany, from about the eleventh of September to the seventeenth of October ; from thence they are seen flying southward by thousands ; and Rædi tells us, they arrive in Tuscany a short time after. There they tear up the fields, newly sown, for the grain just committed to the ground, and do great mischief. It is to be supposed, that, in the severity of winter, they go southward, still nearer the line.

* They are still, though very rarely, to be seen in this country.

They again appear in the fields of Pisa, regularly about the twentieth of February, to anticipate the spring.

In these journeys, it is amazing to conceive the heights to which they ascend when they fly. Their note is the loudest of all other birds; and that is often heard in the clouds, when the bird itself is entirely unseen. As it is light for its size, and spreads a large expanse of wing, it is capable of floating at the greatest height, where the air is lightest; and as it secures its safety, and is entirely out of the reach of man, it flies in tracts which would be too fatiguing for any other birds to move forward in.

In these aerial journeys, though unseen themselves, they have the distinctest vision of every object below. They govern and direct their flight by their cries; and exhort each other to proceed or to descend, when a fit opportunity offers for depredation. Their voice, as was observed, is the loudest of all the feathered tribe; and its peculiar clangour arises from the very extraordinary length and contortion of the windpipe. In quadrupeds, the windpipe is short, and the glottis, or cartilages that form the voice, are at that end of it which is next the mouth; in water-fowl, the windpipe is longer, but the cartilages that form the voice are at the other end, which lies down in their belly. By this means they have much louder voices, in proportion to their size, than any other animal whatever; for the note when formed below, is reverberated through all the rings of the windpipe, till it reaches the air. But the voice of the duck or the goose, is nothing to be compared to that of the crane, whose windpipe is not only made in the same manner with theirs, but is above twenty times as long. Nature seems to have bestowed much pains in lengthening out this organ. From the outside, it enters through the flesh into the breast-bone, which hath a great cavity within to receive it. There being thrice reflected, it goes out again at the same hole, and so turns down to the lungs, and thus enters the body a second time. The loud clangorous sound which the bird is thus enabled to produce, is, when near, almost deafening: however, it is particularly serviceable to the animal itself, either during its migrations, or its stay; by it the flock is encouraged in their journeys; and if, while they are feeding, which is usually performed in profound silence, they are invaded

on any side, the bird that first perceives the danger is sure to sound the alarm, and all are speedily upon the wing.

As they rise but heavily, they are very shy birds, and seldom let the fowler approach them. Their depredations are usually made in the darkest nights ; at which time they enter a field of corn, and trample it down, as if it had been crossed over by a regiment of soldiers. On other occasions, they choose some extensive solitary marsh, where they range themselves all day, as if they were in deliberation ; and not having that grain which is most to their appetites, wade the marshes for insects and other food, which they can procure with less danger.

Corn is their favourite food ; but there is scarcely any other that comes amiss to them. Redi, who opened several, found the stomach of one full of the herb called *dandelion* ; that of another was filled with beans ; a third had a great quantity of clover in its stomach : while that of two others was filled with earth-worms and beetles ; in some he found lizards and sea-fish ; in others, snails, grass, and pebbles, swallowed perhaps for medicinal purposes. It seems, therefore, that these birds are easily supplied ; and that they are noxious to corn-fields but on some particular occasions.*

In general it is a peaceful bird, both in its own society, and with respect to those of the forest. Though so large in appearance, a little falcon pursues, and often disables it. The method is, with those who are fond of hawking, to fly several hawks together against it ; which the crane endeavours to avoid, by flying up perpendicularly, till the air becomes too thin to support it any higher. The hawk, however, still bears it company ; and though less fitted for floating in so thin a medium, yet, possessed of greater rapidity, it still gains the ascendancy. They both often rise out of sight ; but soon the spectator, who keeps his eye fixed above, perceives them, like two specks, beginning to appear : they gather on his eye for a little space, and shortly after come tumbling perpendicularly together, with great animosity on the side of the hawk, and a loud screaming on that of the crane. Thus driven to extremity, and unable to fly, the poor animal throws itself upon its back, and, in that situation, makes a most desperate defence, till the sportsman coming up, generally puts an end to the contest with its life.

* The aliment of cranes is more vegetable than that of storks, herons, &c.

It was once the barbarous custom to breed up cranes to be thus baited ; and young ones were taken from the nest, to be trained up for this cruel diversion. It is an animal easily tamed ; and, if we can believe Albertus Magnus, has a particular affection for man.* This quality, however, was not sufficient to guard it from being made the victim of his fierce amusements. The female, which is easily distinguished from the male, by not being bald behind as he is, never lays above two eggs at a time ; being like those of a goose, but of a bluish colour. The young ones are soon fit to fly, and then the parents forsake them to shift for themselves ; but, before this time, they are led forth to the places where their food is most easily found. Though yet unfledged, they run with such swiftness that a man cannot easily overtake them. We are told, that as they grow old, their plumage becomes darker ; and, as a proof of their longevity, Aldrovandus assures us, that a friend of his kept one tame for above forty years.

Whatever may have been the disposition of the great, the vulgar of every country, to this day, bear the crane a compassionate regard. It is possible the ancient prejudices in its favour, which once having been planted are eradicated but slowly, may still continue to operate. In some countries, it is considered as a heinous offence to kill a crane ; and though the legislature declines to punish, yet the people do not fail to resent the injury. The crane, they, in some measure, consider as the prophet of the season : upon its approach or delay they regulate the periods of their rural economy. If their favourite bird comes early in the season, they expect a plentiful summer ; if he is slow in his visits, they then prepare for an unfavourable spring. Whatever wisdom there may be in despising the prejudices of the vulgar, there is but little in condemning them. They have generally had their origin in good motives ; and it should never be our endeavours to suppress any tender emotions of friendship or pity in those hard breasts that are, in general, unsusceptible of either.

* Busbequius tells us of a Spaniard who was so beloved by a crane of Majorca, that the poor bird would walk any where with him, and in his absence seek about for him, make a noise that he might hear her, and knock at his door ; and when he took his last farewell, not able to sustain her loss and passionate desire, she abstained from all food and died.

CHAP. III.

THE STORK.*

If we regard the Stork externally only, we shall be very apt to confound it with the crane. It is of the same size; it has

* In the methodical arrangements of Ray and Brisson the Storks formed a distinct genus from the Herons and the Cranes, with which, and with various other less closely allied groups, they were united in the Linnean system of classification. Later naturalists have, however, seen the necessity of reverting to the older method, and of again separating these groups, which form in the arrangement proposed by Mr Vigors two families, distinguished by well marked characters, and each comprehending several genera of considerable numerical extent. The first of these families is the Gruidæ, which comprise the Cranes, the trumpeter, and other nearly related genera, distinguished by the comparative shortness and obtuseness of their bill, and the slight degree of palmation exhibited by their feet, which are smaller in proportion and consequently better adapted to the terrestrial habits of these birds, as the bill is to their vegetable food. The second is the Ardeidæ, whose produced and generally pointed bill, and long, slender and more deeply webbed toes, are equally well suited to their aquatic habits, and to the nature of the food, chiefly fishes and reptiles, on which they subsist. In the latter family are comprehended not only the Storks and the Herons, but also the Spoonbills, the Ibis, and several other groups remarkable as well for the singularity of their forms, as for the peculiarity of their manners, and the interesting nature of many of the facts connected with their history, both as regards themselves and with reference to the services which they actually render, or have been supposed to render to mankind.

The distinguishing characters of the genus which at present engages our attention consist in a long straight beak, broad at the base, regularly narrowing to the point, opening to a moderate extent, and unimpressed on its upper surface either with lateral furrows or with a nasal pit; nostrils in the form of a longitudinal fissure, situated near the base of the bill and directed upwards; tongue extremely short; eyes surrounded by a naked skin; wings broad, expanding to a great extent, and prolonged posteriorly beyond the extremity of the tail; legs reticulated with hexagonal scales, of which the uppermost are the largest; web between the two outer of the anterior toes much more developed than that which is found at the base of the inner; posterior toe on the same level with the anterior ones; and claws broad, flat, and obtuse, approaching in form to the nails of man, and scarcely overlapping the extremities of the toes.

The species thus characterised are especially remarkable for the extent and regularity of their migrations, which are chiefly determined by the nature of their food. This consists of various kinds of garbage, of worms and insects, fishes and reptiles, and among the latter more particularly of frogs. At the approach of the colder season, when these animals begin to conceal themselves in holes, in order to pass the winter in a state of torpor, the

the same formation as to the bill, neck, legs, and body, except that it is something more corpulent. Its differences are but very slight; such as the colour, which in the crane, is ash and black, but in the stork is white and brown. The nails of the toes of

Storks are driven by the failure of their usual means of subsistence to seek a more temperate climate, in which the same scarcity of food is not likely to be felt; but they constantly return northwards with the return of spring. The most common and the most celebrated among them is the White Stork, which generally passes its winters in the north of Africa, and more particularly in Egypt, and migrates during the summer season to France and Holland, Sweden, Germany, Poland, and sometimes even Russia, but is very rarely met with in England. It is rather larger than the black stork, measuring more than three feet from the extremity of the bill to the tip of the tail, and standing about the same height from the ground to the top of its head. Its bill, which is usually of an orange red, measures from seven to eight inches in length; the naked and wrinkled skin surrounding its eyes is nearly of the same colour, but generally of a duskier hue; and its legs are also red. The greater part of its plumage is of a clear white, which is however relieved by the striking contrast of the feathers covering the lower part of the shoulders, the larger wing-coverts, and the quill-feathers, thirty in number, all of which are of a glossy black, with a slight metallic reflection. When fully expanded the extent of the wings exceeds six feet, and in this state the eight or nine primary quill-feathers offer a very singular and indeed unique disposition, being separated from each other so as to leave a vacant space between. The feathers of the lower part of the neck are long, pendulous, and pointed. There is little distinction in any of these particulars between the male and the female; but the young have a browner tinge in their wings, and their bills are of a duskier red.

These birds have in all ages been regarded with peculiar favour, amounting, in some countries, almost to veneration, partly on account of the services which they perform in the destruction of noxious animals, and in removing impurities from the surface of the earth, and partly on account of the mildness of their temper, the harmlessness of their habits, and the moral virtues with which imagination has delighted to invest them. Among the ancient Egyptians the Stork was regarded with a reverence inferior only to that which, for similar causes, was paid to the sacred Ibis, considered, and with some show of reason, as one of the tutelary divinities of the land. The same feeling is still prevalent in many parts of Africa and the East; and even in Switzerland and in Holland something like superstition seems to mingle, in the minds of the common people, with the hospitable kindness which a strong conviction of its utility disposes them to evince towards this favourite bird. In the latter country more particularly, the protection which is accorded to it is no more than it fairly deserves as the unconscious instrument by which the dikes and marshes are relieved from a large portion of the enormous quantity of reptiles engendered by the humidity and fertility of the soil.

On the other hand, the white stork appears to be influenced by the same friendly feelings towards man. Undismayed by his presence, it builds its nest upon the house-top, or on the summits of the loftiest trees in the im-

the stork also are very peculiar ; not being clawed like those of other birds, but flat like the nails of a man.

These, however, are but very slight differences ; and its true distinctions are to be taken rather from its manners than its

mediate neighbourhood of the most frequented places. It stalks perfectly at its ease along the busy streets of the most crowded town, and seeks its food on the banks of rivers or in fens in close vicinity to his abode. In numerous parts of Holland its nest, built on the chimney-top, remains undisturbed for many succeeding years, and the owners constantly return with unerring sagacity to the well known spot. The joy which they manifest on again taking possession of their deserted dwelling, and the attachment which they testify towards their benevolent hosts, are familiar in the mouths of every one. Their affection for their young is one of the most remarkable traits in their character. It is almost superfluous to repeat the history of the female which, at the conflagration of Delft, after repeated and unsuccessful attempts to carry off her young, chose rather to perish with them in the general ruin than to leave them to their fate : and there are many other and well authenticated proofs of a similar disposition. They generally lay from two to four eggs, of a dingy yellowish white, rather longer than those of the goose, but not so broad. The incubation lasts for a month, the male sharing in the task during the absence of the female in search of food. When the young birds are hatched, they are carefully fed by their parents, who watch over them with the closest anxiety. As soon as they become capable of flying, the parents exercise them in it by degrees, carrying them at first upon their own wings, and then conducting them in short circular flights around their nest.

When in search of food, the stork is commonly seen in its usual attitude of repose, standing upon one leg, with its long neck bent backwards, its head resting on its shoulder, and its eye steadily fixed. Its motions are slow and measured, the length of its steps corresponding with that of its legs. In flight its head and neck are directed straight forwards, and its legs extended backwards ; an awkward and apparently constrained position, but that which is best calculated for enabling it to cleave the air with rapidity. The large extent of its wings and the comparative lightness of its body are also admirably adapted to the lofty pitch at which it flies, and to its long continuance upon the wing.

The storks generally migrate about the beginning of August, and the preparations for their departure usually occupy several weeks. They appear gradually to assemble in one spot from the whole of the surrounding district to the number of many hundreds, making when they meet that peculiar clattering with their beaks, which appears to serve them in the place of voice. As soon as their number is completed the entire body mount at once into the air, without noise or confusion, and are speedily lost sight of in the loftiness of their flight. Their departure has rarely been witnessed by scientific observers ; and many incredible stories have consequently been told respecting it. They return to Europe in smaller bands in the months of March and April. Those which remain in the more northern countries during the winter, either tamed or in captivity, in which state they appear perfectly contented, do not seem to suffer in the least from the severity of the weather.

form. The crane has a loud piercing voice ; the stork is silent, and produces no other noise than the clacking of its under-chap against the upper : the crane has a strange convulsion of the wind-pipe through the breast-bone ; the stork's is formed in the usual manner : the crane feeds mostly upon vegetables and grain ; the stork preys entirely upon frogs, fishes, birds, and serpents : the crane avoids towns and populous places ; the stork lives always in or near them : the crane lays but two eggs ; and the stork generally four. These are distinctions fully sufficient to

The *Black Stork* resembles the White in form and proportions, but is somewhat smaller in size ; and the hue of its plumage, as might be gathered from the epithets applied to the two birds, is very different. But these epithets, if taken strictly, are far from being correct : the White Stork having, as we have seen, a portion of its plumage black ; and the Black exhibiting a variety of shades, of which, however, that from which it derives its name is the most predominant. Its bill, like that of the former bird, is full seven inches in length, and of a dusky red, approaching to orange ; as are also the legs and toes. The colour of the naked skin surrounding the eyes is dull red, and that of the irides hazel. On the head, neck, upper surface of the body and wings, the feathers are of a deep glossy black, intermingled with varying shades and reflections of violet and green, which become more strongly marked on the back and wings. Those of the whole under surface from the bottom of the neck to the base of the tail are white. The tail itself is black. The wings are extremely long, and so powerful as to raise the bird, in its flights and migrations, to such a height in the air as to be almost invisible to human eye.

Like the foregoing species, the black stork is a migratory bird, seeking the more southern parts of Europe during the inclemency of winter. In the spring it advances to a much higher latitude than the white, visiting even Russia and Siberia, and passing over Sweden towards the north in considerable numbers. But it seldom comes so far westward as the other, being almost unknown in Holland, although common in the eastern departments of France and throughout the whole of Germany. A solitary instance of its occurrence in Great Britain fell under the notice of the late Colonel Montagu, and forms the subject of an interesting paper in the twelfth volume of the *Linnean Transactions*.

The character of the black stork is in one respect diametrically opposed to that of the white. Instead of domesticating itself as it were with man, it shuns his society and makes its temporary dwelling in the most secluded spots, frequenting impenetrable morasses or the banks of such rivers and lakes as are seldom disturbed by the presence of intruders, and building its nest on the summits of the loftiest pines. Its food is exactly similar to that of its more social fellow ; and their manners, except in this peculiar sullenness on the part of the black stork, closely correspond. It submits itself with perfect resignation to captivity, never using its powerful bill as a weapon of offence against its companions. It appears to have no other voice than the clattering sound which it produces by the snapping of its mandibles.

—*Zoological Society Gardens.*

mark the species, notwithstanding the similitude of their form.

Storks are birds of passage, like the former ; but it is hard to say whence they come, or whither they go. When they withdraw from Europe, they all assemble on a particular day, and never leave one of their company behind them. They take their flight in the night ; which is the reason the way they go has never been observed. They generally return into Europe in the middle of March, and make their nests on the tops of chimneys and houses, as well as of high trees. The females lay from two to four eggs, of the size and colour of those of geese ; and the male and female sit upon them by turns. They are a month in hatching ; and when their young are excluded, they are particularly solicitous for their safety.

As the food of these birds consists, in a great measure, of frogs and serpents, it is not to be wondered at that different nations have paid them a particular veneration. The Dutch are very solicitous for the preservation of the stork in every part of their republic. This bird seems to have taken refuge among their towns ; and builds on the tops of their houses without any molestation. There it is seen resting familiarly in the streets, and protected as well by the laws as the prejudices of the people. They have even got an opinion that it will only live in a republic ; and that story of its filial piety, first falsely propagated of the crane, has, in part, been ascribed to the stork. But it is not in republics alone that the stork is seen to reside, as there are few towns on the continent, in low marshy situations, but have the stork as an inmate among them ; as well the despotic princes of Germany, as the little republics of Italy.

The stork seems a general favourite even among the moderns ; but with the ancient Egyptians their regard was carried even to adoration. This enlightened people, who worshipped the Deity in his creatures, paid divine honours to the ibis, as is universally known. It has been usually supposed that the ancient ibis is the same with that which goes at present by the same name ; a bird of the stork kind, of about the size of a curlew, all over black, with a bill very thick in the beginning, but ending in a point, for the better seizing its prey, which is caterpillars, locusts, and serpents. But however useful the modern ibis may be in ridding Egypt, where it resides, of the vermin and venomous

animals that infest it; yet it is much doubted whether this be the same ibis to which the ancients paid their adoration. Maillet, the French consul at Cairo, observes, that it is very hard to determine what bird the ancient ibis certainly was, because there are cranes, storks, hawks, kites, and falcons, that are all equally enemies to serpents, and devour a vast number. He farther adds, that in the month of May, when the winds begin to blow from the internal parts of Africa, there are several sorts of birds that come down from Upper Egypt, from whence they are driven by the rains, in search of a better habitation, and that it is then they do this country such signal services. Nor does the figure of this bird, hieroglyphically represented on their pillars, mark it sufficiently to make the distinction. Besides, the modern ibis is not peculiar to Egypt, as it is to be seen but at certain seasons of the year; whereas we are informed by Pliny, that this bird was seen no where else. It is thought, therefore, that the true ibis is a bird of the vulture kind, described above, and called by some the *capon of Pharaoh*, which not only is a devourer of serpents, but will follow the caravans that go to Mecca, to feed upon the offal of the animals that are killed on the journey.*

* That a bird so highly celebrated in mythological history as the ibis of ancient Egypt, incessantly represented on the early monuments of the country which it still inhabits, and transmitted to us in almost infinite numbers in the shape of mummies from a remote antiquity, should have been widely mistaken by every modern writer until within the last fifty years, is indeed matter of astonishment; but such is really the fact. Belon, an excellent ornithologist, who visited Egypt about the middle of the sixteenth century, imagined that the stork was the true ibis of the ancients: Pocock maintained that the latter was a species of Crane: and De Maillet conjectured that under the name of ibis were generically comprehended all those birds which are instrumental in removing the noxious reptiles that swarm in the inundated lands. Perrault first introduced the erroneous notion that the ibis of antiquity was a species of Tantalus, in which he was followed implicitly by naturalists throughout the whole of the last century. Brisson, Buffon, Linnaeus, and Latham, all united to give it currency; and the Tantalus ibis of the two latter authors was universally regarded as the sacred bird.

Our adventurous countryman Bruce was the first to throw a doubt upon the authenticity of this determination, and to point out the identity between the figures represented on the ancient monuments, the mummies preserved in the Egyptian tombs, and a living bird common on the banks of the Nile and known to the Arabs by the name of Abou Hannes. But it was not until after the return of the French expedition from Egypt that the ques-

CHAP. IV.

OF THE BALEARIC AND OTHER FOREIGN CRANES.

HAVING ended the last chapter with doubts concerning the ibis, we shall begin this with doubts concerning the Balearic

tion was definitively settled by a careful anatomical comparison of the ancient mummies and recent specimens then brought home by Geoffroy-Saint-Hilaire and Savigny. From the examination of these materials M. Cuvier was enabled to verify Bruce's assertion, and to restore to science a bird which, after having formed for centuries the object of a nation's adoration, had fallen into oblivion, and was wholly unknown to modern naturalists. At the same time he pointed out those distinctive characters on which M. Lacepede founded the genus ibis, formally established by M. Cuvier himself in the first edition of his *Regne Animal*.

The ibis genus is characterized by a long and slender bill, nearly square at its base, where it is of less breadth than the head, almost straight for about one half of its length, and having the remaining part gradually curved downwards, blunt at its point and without any notch; nostrils situated near the base of the bill at the commencement of a groove which is continued along each side of its upper surface as far as to its point; the head, and sometimes the neck, devoid of feathers to an extent varying in the different races; wings of moderate length; tarsi slender; and toes webbed at the base, the hinder one placed somewhat above the level of the others but being of sufficient length to rest upon the earth. In many of these characters we observe a considerable deviation from those of the Storks and other typical examples of the family with which the ibis is associated, and a marked approach to the Curlews. From the natural habits and organization of the ibis, confirmed by analogy, and further corroborated by the testimony of the modern Egyptians, it does not appear that it feeds upon reptiles. We must, then, look for other reasons than the destruction of serpents, for the veneration paid to the ibis by the ancient Egyptians, who admitted it even into their temples, and prohibited the killing of it, under pain of death. In a country, where the people, very ignorant, were governed only by superstitious ideas, it was natural that fictions should have been imagined, to express with energy the happy influences of that phenomenon which every year attracts the ibis into Egypt, and retains it there. Its constant presence at the epoch of that inundation, which annually triumphs over all the sources of decay, and assures the fertility of the soil, must have appeared to the priests and the persons at the head of government admirably calculated to make a lively impression on the minds of the people, to lead them to suppose supernatural and secret relations between the movements of the Nile and the sojourn of these inoffensive birds, and to consider the latter as the cause of effects exclusively owing to the overflow of the river.

Besides the white and black ibis, another ibis, entirely black, was equally revered in Egypt, and embalmed in a similar manner. This one is more elegant and slender than the other in its external form, and its internal or

Crane. Pliny has described a bird of the crane kind with a topping resembling that of the green wood-pecker. This bird for a long time continued unknown, till we became acquainted with the birds of tropical climates, when one of the crane kind

gans are also more contracted. M. Savigny has opened about twenty individuals of this species, and has found nothing in their very narrow gizzard, but small fluviatile shells, with some debris of vegetables, which probably enveloped the shells at the moment in which they were swallowed, and cannot be considered as properly constituting any part of the aliment of these birds.

The two species have a powerful and elevated flight. In this action the neck and feet are extended horizontally, and from time to time, the birds, all together, send forth deep and hoarse cries, more powerful in the white ibis than in the black. When these birds alight on lands which they have newly discovered, they remain crowded against each other, and may be seen for entire hours, occupied in searching the mud with their bills, advancing slowly, step by step, and never springing with rapidity like the curlews. The ibis does not nestle in Egypt. Those of the white kind arrive as soon as the Nile begins to increase, and their number augments or diminishes, as do its waters. Their migration takes place towards the end of June, the epocha at which, according to Bruce, they arrive in Ethiopia. The black ibis, which comes later into Egypt, also remains there longer. The moment when the ibides retire with the waters of the Nile, is the time in which the hunters prefer to pursue them. They seldom shoot them with fire-arms, but lay nets for them; and during autumn, many, whose heads have been previously severed from their bodies, are found in the markets of Lower Egypt, especially in that of Damietta. Many of the ibides, both black and white, were brought alive to M. Savigny, who observed that they most frequently held their body nearly horizontal, with the neck inflected, and the head inclined—were in the habit of striking the earth with the end of their bill, and sometimes resting on one foot only. The same naturalist remarks, that the white ibis sometimes goes alone, and sometimes in small troops of from eight to ten, while the black species, more numerous, forms flocks of from thirty to forty.

The *Scarlet Ibis* is a native of America. These birds live almost always in flocks, and the old ones most frequently form distinct and separate bands. Their flight is rapid and sustained, but they do not put themselves in motion, except in the morning and evening, for the purpose of seeking their food, which consists of insects, shell animals, and small fishes, collected in the slime along the sea-coast, or at the mouths of rivers. During the greatest heat of the day and at night, they remain in sheltered places. The broods commence in January, and are concluded in May. They deposit their eggs, which are greenish, in large tufts of grass, or on little piles collected in the brush-wood. These ibides are spread throughout the warmest countries of America, and being not at all wild they are easily accustomed to live in houses. M. de la Borde mentions his having kept one for more than two years. It was fed with bread, raw or cooked meat, and fish; but it gave the preference to the entrails of fish and fowl. It would frequently occupy itself in seeking for earth-worms around the house, or following the

with a topping was brought into Europe, and described by Aldrovandus as Pliny's Balearic Crane. Hence these birds, which have since been brought from Africa and the East in numbers, have received the name of Balearic Cranes, but without any just foundation. The real Balearic Crane of Pliny seems to be the lesser ash-coloured heron, with a topping of narrow white feathers ; or perhaps the egret, with two long feathers that fall back from the sides of the head. The bird that we are about to describe under the name of the Balearic Crane, was unknown to the ancients, and the heron or egret ought to be reinstated in their just title to that name.

When we see a very extraordinary animal, we are naturally led to suppose that there must be something also remarkable in its history, to correspond with the singularity of its figure. But it often happens that history fails on those occasions where we most desire information. In the present instance, in particular, no bird presents to the eye a more whimsical figure than this, which we must be content to call the *Balearic Crane*. It is pretty nearly of the shape and size of the ordinary crane, with long legs and a long neck, like others of the kind ; but the bill is shorter, and the colour of the feathers of a dark greenish gray. The head and throat form the most striking part of this bird's figure. On the head is seen, standing up, a thick round crest, made of bristles, spreading every way, and resembling rays standing out in different directions. The longest of these rays are about three inches and a half, and they are all topped with a kind of black tassels, which give them a beautiful appearance. The sides of the head and cheeks are bare, whitish, and edged with red ; while underneath the throat hangs a kind of bag or wattle, like that of a cock, but not divided into two. To give this odd composition a higher finishing, the eye is large and star-

labours of a negro gardener. In the evening, this bird would retire of itself into a poultry-house, where it reposed in the midst of a hundred fowl. It would perch on the highest bar, awake very early in the morning, fly round the house, and sometimes proceed to the sea-shore. It would attack cats with great intrepidity. It would have lived longer, had it not been accidentally killed, by a fowler, who mistook it for a wild curlew, when it was on a pond. All this shows the possibility of rearing in the warmer climates of Europe a bird which, according to the testimony of Laet, has already produced in a domestic state, and may, perhaps, one day be turned to good account.

ing; the pupil black and big, surrounded with a gold-coloured iris, that completes the bird's very singular appearance.

From such a peculiar figure, we might be led to wish for a minute history of its manners; but of these we can give but slight information. This bird comes from the coast of Africa and the Cape de Verd Islands. As it runs, it stretches out its wings, and goes very swiftly, otherwise its usual motion is very slow. In their domestic state, they walk very deliberately among other poultry, and suffer themselves to be approached (at least it was so with that I saw) by every spectator. They never roost in houses; but about night, when they are disposed to go to rest, they search out some high wall, on which they perch in the manner of a peacock. Indeed, they so much resemble that bird in manners and disposition, that some have described them by the name of the *sea peacock*: and Ray has been inclined to rank them in the same family. But though their voice and roosting be similar, their food, which is entirely upon greens, vegetables, and barley, seems to make some difference.*

* *The Gigantic Crane.* This is a very large species, which belongs to the Stork genus, measuring from tip to tip of the wings nearly fifteen feet. The bill is of a vast size, nearly triangular, and sixteen inches round at the base. The head and neck are naked, except a few straggling curled hairs. The feathers of the back and wings are of a bluish ash colour, and very stout; those of the breast are long. The craw hangs down the fore part of the neck like a pouch. The belly is covered with a dirty white down; and the upper part of the back and shoulders are surrounded with the same. The legs and half the thighs are naked; and the naked parts are full three feet in length.

This bird is an inhabitant of Bengal and Calcutta, and is sometimes found on the coast of Guinea. It arrives in the internal parts of Bengal before the period of the rains, and retires as soon as the dry season commences. Its aspect is filthy and disgusting; yet it is one of the most useful birds of these countries, in clearing them of snakes and noxious reptiles and insects. It seems to finish the work begun by the jackal and vulture; they clearing away the flesh of animals, and these birds removing the bones by swallowing them entire. They sometimes feed on fish; and one of them will generally devour as much as would serve four men. On opening the body of a gigantic crane, a land tortoise ten inches long, and a large black male cat, were found entire within it; the former in the craw, and the latter in the stomach. Being altogether undaunted at the sight of mankind, they are soon rendered familiar; and when fish or other food are thrown to them, they catch them very nimbly, and immediately swallow them whole.

The gigantic cranes are believed by the Indians to be animated by the souls of the Bramins, and consequently to be invulnerable. They are held in the highest veneration both by the Indians and Africans. Mr Ives, in

In this chapter of foreign birds of the crane kind, it will be proper to mention the Jabiru and the Jabiru Guacu, both natives of Brazil. Of these great birds of the crane kind we know but little, except the general outline of their figure, and the enormous bills which we often see preserved in the cabinets of the curious. The bill of the latter is red, and thirteen inches long; the bill of the former is black, and is found to be eleven. Neither of them, however, are of a size proportioned to their immoderate length of bill.—The jabiru guacu is not above the size of a common stork, while the jabiru with the smallest bill exceeds the size of a swan. They are both covered with white feathers, except the head and neck, that are naked; and their principal difference is in the size of the body and the make of the bill; the lower chap of the jabiru guacu being broad, and bending upwards.*

attempting to kill some of them with his gun, missed his shot several times; which the bye-standers observed with the greatest satisfaction, telling him triumphantly that he might shoot at them as long as he pleased, but he never would be able to kill them.

Gigantic cranes are found in companies; and when seen at a distance, near the mouths of rivers, coming towards an observer, (which they do with their wings extended,) it is said that they may be easily mistaken for canoes on the surface of a smooth sea; and when on the sand-banks, for men and women picking up shell-fish on the beach.

* The *JABIRUS* are not considered by Illiger and Temminck, as forming a distinct genus from the storks. But Linnæus, Latham, Lacepede, and other ornithologists, have not hesitated to form a separate genus of this bird, under the name of *MYCTERIA*, giving as the principal character the slight recurvation of the bill upwards. In other respects, the characters of the jabirus resemble those of the storks.

The *American Jabiru* is described by Azara under the name of *Collier Rouge*, and is called in Paraguay *Aiatui*. It also inhabits Brazil, where it is named *Jabiru Guacu*, and is found in some other parts of South America. It is the *Negro* of the Hollanders, and the *Touyouyou* of the native tribes of French Guiana. It is one of the largest and strongest of shore-birds. It is mounted on very high stilts, and its body is as bulky and more elongated than that of the swan. The skin of the neck is wrinkled, and so flaccid that it depends like the dew-lap of a cow. This circumstance has given rise to the name of *Jabiru*, which in the language of the Guaranis signifies any thing inflated by the wind. The legs, very robust, are covered with large scales, and denuded of feathers for about the space of six inches.

The jabirus constantly inhabit the humid grounds of South America, and are found in considerable abundance in the inundated savannahs of Guiana. They never quit their sojourn but to rise slowly into the heights of the atmosphere, where they support themselves for a very long time. These birds are voracious, and live only on fish and reptiles. They construct, on lofty trees, with long branches carefully interlaced, a spacious nest, in which

A bird still more extraordinary may be added to this class, call the *anhima*, and, like the two former, a native of Brazil. This is a water-fowl of the rapacious kind, and bigger than a swan. The head, which is small for the size of the body, bears a black bill, which is not above two inches long ; but what distinguishes it in particular is a horn growing from the forehead as long as the bill, and bending forward like that of the fabulous unicorn of the ancients. This horn is not much thicker than a crow-quill, as round as if it were turned in a lathe, and of an ivory colour. But this is not the only instrument of battle this formidable bird carries ; it seems to be armed at all points ; for at the fore-part of each wing, at the second joint, spring two straight triangular spurs, about as thick as one's little finger : the foremost of these goads or spurs is above an inch long ; the hinder is shorter, and both of a dusky colour. The claws also are long and sharp ; the colour is black and white ; and they cry terribly loud, sounding something like *Vyhoo, Vyhoo*. They are never found alone, but always in pairs ; the cock and hen prowl together ; and their fidelity is said to be such, that when one dies, the other never departs from the carcase, but dies with its companion. It makes its nest of clay, near the bodies of trees, upon the ground, of the shape of an oven.

One bird more may be subjoined to this class, not for the oddity of its figure, but the peculiarity of its manners. It is vulgarly called by our sailors the *buffoon bird*, and by the French the *demoiselle*, or *lady*. The same qualities have procured it these different appellations from two nations, who, on more occasions than this, look upon the same objects in very different lights. The peculiar gestures and contortions of this bird, the proper name of which is the *Numidian Crane*, are extremely singular ; and the French, who are skilled in the arts of elegant gesticulation, consider all its motions as lady-like and

the female deposits but one or two eggs. The young are fed with fish until they are strong enough to descend from the nest, and are defended by the parents with great courage. This nest is said to serve for several broods.

The jabirus appear to be less wild in Guiana than in Paraguay. Bajon tells us that in 1773 a little negro contrived, by merely concealing his face with the branch of a tree, to approach a young one that had almost acquired its full growth, sufficiently near to seize it by the legs and catch it. The flesh of the old is hard and oily ; but that of the young is tender, and tolerably good eating.

graceful. Our English sailors, however, who have not entered so deeply into the dancing art, think, that while thus in motion, the bird cuts but a very ridiculous figure. It stoops, rises, lifts one wing, then another, turns round, sails forward, then back again ; all which highly diverts our seamen ; not imagining, perhaps, that all these contortions are but the awkward expression, not of the poor animal's pleasures, but its fears.*

It is a very scarce bird ; the plumage is of a leaden gray ; but it is distinguished by fine white feathers, consisting of long fibres, which fall from the back of the head, about four inches long ; while the fore-part of the neck is adorned with black feathers, composed of very fine, soft, and long fibres, that hang down upon the stomach, and give the bird a very graceful appearance. The ancients have described a buffoon bird ; but there are many reasons to believe that theirs is not the Numidian crane. It comes from that country from whence it has taken its name.

* The *Demoiselle Heron*, *Ardea Virgo*, *Grus Virgo*, *Demoiselle de Numidie*, &c., owes its name to its elegant gait, the ornamental plumes of its head, and certain mimic gestures which it makes,—inclining its head, walking with a kind of ostentatious air, and leaping and bounding as if it were about to dance. All these peculiarities of the demoiselle of Numidia are mentioned by many ancient writers ; and Xenophon in Athenæus speaks of a stratagem by which these birds might be caught, which consisted in rubbing one's self with water in their presence, and then filling the vessel with glue before going away. Notwithstanding this, the acquaintance of the moderns with this species is comparatively of but recent date. They at first confounded it with the *Scops* and *Otus* of the Greeks, *Asio* of the Latins, in consequence of the gestures which that owl makes with its head, and by mistaking its ears for the tuft of slender threads which covers those of the demoiselle. M. de Savigny, in his observations on the system of the birds of Egypt and Syria, demonstrates, with much acumen, that the bird in question here is the *Crex* of the Greeks ; and he also mentions that it is the *Bibio*, or *Grus Balearica*, and *Grus Minor*, of the Latins, though ornithologists place these denominations in the synonymy of the preceding species.

These birds are found in various parts of Africa and Asia, in the interior of the countries of the Cape of Good Hope, but more particularly in the ancient Numidia ; and they are observed to arrive in Egypt at the epoch of the inundation of the Nile. Some are also found on the southern coasts of the Black Sea, and the Caspian ; but it is invariably marshy places which they frequent. They feed indifferently on grains, insects, worms, shell-mollusca, and even small fishes, which they catch with great dexterity. Their cry resembles the clamorous tones of the crane, but is much more feeble, and sharper.

CHAP. V.

OF THE HERON, AND ITS VARIETIES.*

BIRDS of the Crane, the Stork, and the Heron kind, bear a very strong affinity to each other : and their differences are not

* Cranes are distinguished by having the head bald ; Storks have the orbits round the eyes naked ; and Herons have the middle claw serrated internally. Herons comprehend the species known under the names of Egrets, Bitterns, Crab-eaters, &c. In the genus *Ardea*, now limited to the Herons and Bitterns, the bill is considerably longer than the head, sharp at the point, straight or very slightly curved, compressed laterally, cleft to the very base, and frequently armed at the edges with sharp denticulations ; the upper mandible is marked on either side by a longitudinal groove, in which the linear nostrils are perforated near the base of the bill ; from the bill to the eyes extends a space destitute of feathers ; the tarsi are long and covered with large scales ; the legs naked for some distance above the knee-joints ; the toes long and slender, the outer one united to the middle by a membranous expansion, and the posterior attached so low down as to allow of its resting its whole length upon the ground ; the anterior claws of moderate length, slightly curved and pointed, with a denticulated dilatation on the inner side of that of the middle toe ; the posterior claw very long, arched, and pointed ; and the wings long, with the first quill-feathers shorter than the two succeeding ones, which are the longest of the series. Thus restricted, the genus is extremely numerous ; for M. Vieillot states it to be composed of no fewer than eighty species. These are distributed by M. Cuvier into six sections or subdivisions, among which the true Herons are principally distinguished by the great length of their legs and neck, the long pendant plumes of the lower part of the neck, and the perfectly straight direction of the bill.

The Common Heron is, as its name implies, one of the most frequent and best known species of the group. It is about three feet four inches in length, measuring from the end of the anterior toes to the extremity of the bill ; from the bill to the tail it measures nearly three feet, of which the tail forms about eight inches ; and the expanse of its wings exceeds five feet. It does not, however, weigh more than three pounds and a half, and its buoyancy in flight is consequently very considerable. The general colour of the whole upper surface of the bird is an ashy gray with somewhat of a bluish tinge. This is deeper on the back of the head, which is likewise ornamented with a dependent crest of narrow blackish feathers, three inches or more in length, overshadowing the back of the neck. The upper part and sides of the neck are of a light gray, running into the pure ash-colour of the back, and the latter passing into a deeper shade of ashy gray upon the tail. The wing-coverts are nearly of the same colour, with a slight tinge of reddish ; and the quill-feathers black with a bluish gloss. On the under parts the ground-colour of the plumage is a pure white, marked on the fore part of the neck and breast with large longitudinal black drops. The abdomen,

easily discernible. As for the crane and the stork, they differ rather in their nature and internal conformation, than in their external figure; but still they may be known asunder, as well by their colour as by the stork's claws, which are very peculiar,

upper part of the throat, and legs, are pure white. The naked space between the bill and eyes is of a grayish yellow; the iris is yellow; the bill bluish above and yellow beneath; the legs, which are bare of feathers for two or three inches above the knees, are somewhat flesh-coloured in their upper part and grayish brown below; and the claws black. The middle toe, with the addition of its claw, does not measure more than four inches; and is consequently much shorter than the tarsus, which exceeds six inches in length. Beneath the anterior half of the bill, which is about five inches long, the skin is capable of considerable distention. There is little difference in the colours of the female; but the young bird has no crest on the head, and its back and wings are of a darker gray.

The Herons may be regarded as birds of passage, but their stay or departure seems everywhere to be regulated by their means of procuring food. They are no where very abundant, although they are met with in almost every part of the northern and temperate regions of the Old Continent, and perhaps also in the New. In Europe they migrate as far northward as Drontheim, and are found even in Russia and Poland, but they are most common in England, France, and Holland.

They build their nests, in numerous companies, on lofty trees, and more especially oaks, in the immediate neighbourhood of streams and marshes. The nest is of large dimensions, constructed externally of twigs, dry herbs and reeds, and lined internally with feathers and wool. In this the female deposits her eggs, three or four in number, about the size of those of the common hen, but more elongated, and of a greenish brown colour without spots. The male does not share in the task of incubation; but flies abroad in search of food, while the female tends her charge at home. They are particularly fond of the society of ravens, but the latter often carry off their eggs; and the falcons, weasels, and martens, are dangerous enemies to their young. When the young are hatched, both parents assist in providing them with food until they are able to fly, and bring them abundance of fish for their support. But as soon as they become capable of a continued flight they are driven from the nest, and proceed each in a separate direction to seek its own subsistence wherever it may be most plentifully procured.

The old birds quit their nests about the middle of August, and wander from stream to stream, and from lake to lake, forming themselves into gradually increasing bands as the colder season approaches. Towards the beginning of September they are often met with in companies of from twenty to thirty in a spot; but as soon as the frost sets in, they begin their migration to the southward, taking their flight by moonlight, like the Cranes, but not with the same order and regularity. They return about the latter end of March, when the severity of the season is no longer to be dreaded. Some few, however, remain throughout the winter, especially when the weather is variable, and are occasionally seen, in company with the wild ducks, at the commencement of a sudden thaw. They usually disappear with the return of frost.

and more resembling a man's nails than the claws of a bird. The heron may be distinguished from both, as well by its size, which is much less, as by its bill, which in proportion is much longer ; but particularly by the middle claw on each foot, which is toothed

Their food consists principally, like that of most of the birds of the wading order, of fresh-water fishes, but more particularly of the young fry of carp and trout. In pursuit of these they wade gently into the water, where the fish abound, and stand in it up to their knees, (or rather to their knee, for they rest only on one foot,) with their heads drawn in by the folding of their long necks upon the breast, quietly watching the approach of their prey. It has been remarked, not merely by the vulgar, but by observers deserving of implicit confidence, that the fish generally swarm around them in sufficient number to afford them a plentiful supply ; and this has been commonly accounted for on the supposition that their legs communicate a peculiar odour to the water which entices the fish to their destruction. But M. Bechstein, who vouches for the fact as one which he had seen innumerable times, suspects that the source of attraction is in the excrements of the bird, which it lets fall into the water, and which the fish, as is proved by experiment, devour with the utmost avidity. The time of fishing is usually before sunrise or after sunset. They generally swallow their prey entire, and many stories are current of eels escaping alive through their intestines, and being a second time devoured by the voracious birds. Besides fishes, frogs form a considerable portion of their food, and in winter they are frequently compelled to content themselves with snails and worms, or, according to M. de Salerne, even with the duck-weed that floats upon the stagnant waters. At such times they occasionally become so emaciated as to appear to consist of little else than feathers and bones.

Heron is taken in various ways. Sometimes they are shot while fishing, or sweeping leisurely along the banks ; but they are so shy that the sportsman can rarely get within gunshot of them. Occasionally a living fish is attached to a hook at the end of a line, and left to swim in the waters which they are known to frequent ; and they are thus caught as it were by angling. When falconry was in fashion, hawking at the heron was regarded as the most noble of its branches ; the powerful wings of the heron, unequalled by any bird of its size, enabling it to mount in the air to an almost incredible height, and thus to put the powers of the falcon to their proof. For this purpose it was customary to establish the herons in a proper situation, to which they were attached by precautions taken for providing them with necessities. These heronries, as they were called, have now become extremely rare ; but one of them may still be seen in the parish of Craigie, near Kilmarnock, in Ayrshire.

The heron, when taken young, readily becomes habituated to captivity ; but the old birds generally refuse all sustenance, and perish of inanition. In former days, when it was necessary to procure such for the training of the hawks, it was usual, according to Sir J. Sebright, "to cram them with food, and to tie a piece of mat round their necks to prevent them from throwing it up again." Sometimes, however, the old birds have been known to become tame and even domesticated ; and the same distinguished authority to whom we have just referred, mentions an instance that occurred within

like a saw, for the better seizing and holding its slippery prey. Should other marks fail, however, there is an anatomical distinction, in which herons differ from all other birds; which is, that they have but one cœcum, and all other birds have two.

Of this tribe, Brisson has enumerated not less than forty-

his own knowledge, in which, after recourse had been had to the operation of cramming and tying down the food, the bird "became so tame as to follow its master on the wing to the distance of some miles, to come into the house when called, and to take food from the hand."

The *Night Heron*, so called from the hoarse croaking which it utters during the night, is about twenty inches in length. The bill is three inches and three quarters long, slightly arched, strong, and black, inclining to yellow at the base; the skin from the beak round the eyes is bare, and of a greenish colour; irides yellow. A white line is extended from the beak over each eye; a black patch, glossed with green, covers the crown of the head and nape of the neck, from which three long narrow white feathers, tipped with brown, hang loose and waving; the hinder part of the neck, coverts of the wings, the sides and tail, are ash-coloured; throat white; fore part of the neck, breast, and belly, yellowish white or buff; the back black; the legs a greenish yellow. The female is nearly of the same size as the male; but she differs considerably in her plumage, which is less bright and distinct, being more blended with clay or dirty white, brown, gray, and rusty ash-colour; and she has not the delicate plumes that flow from the head of the male. The night-heron frequents the sea-shores, rivers, and inland marshes; and lives upon insects, slugs, frogs, reptiles, and fish. It remains concealed during the day, and does not roam abroad until the approach of night, when it is heard and known by its harsh, rough, and disagreeable cry, which is by some compared to the noise made by a person straining to vomit. Some ornithologists affirm, that the female builds her nest in trees; others, that she builds it on rocky cliffs; probably both accounts are right. She lays three or four white eggs.

Crested Purple Heron.—It inhabits Asia, and is two feet ten inches in length. The bill is brown, tipped with dusky brown, and is yellowish beneath; the crest is of a black colour; the orbits naked and yellowish; from the angle of the mouth to the hind head it has a black streak; the chin is white; upper half of the neck rufous, with three longitudinal black lines; the rest olive behind, and rufous at the sides, and reddish on the fore-part; the feathers are long, narrow, each marked with a black spot; a black band passes from the middle of the breast to the vent; the lower tail coverts are white, mixed with rufous and tipped with black; angles of the wings rufous; the quill feathers dusky; and the legs greenish; hind-head black; the crest pendent, consisting of two long feathers; the body is of an olive colour, and beneath it is purplish.

The smaller herons with shorter feet have been called *Crab-eaters*. The *Egrets* are herons, whose plumes on the lower part of the back are, at a certain period, long and attenuated. These plumes were formerly used to decorate the helmets of warriors; they are now applied to a gentler and better purpose, in ornamenting the head-dresses of the European ladies, and the turbans of the Persians and Turks.

seven sorts, all differing in their size, figure, and plumage; and with talents adapted to their place of residence, or their peculiar pursuits. But, how various soever the heron kind may be in their colours or their bills, they all seem possessed of the same manners, and have but one character of cowardice, rapacity, and indolence, yet insatiable hunger. Other birds are found to grow fat by an abundant supply of food; but these, though excessively destructive and voracious, are ever found to have lean and carrion bodies, as if not even plenty were sufficient for their support.

The common heron is remarkably light, in proportion to its bulk, scarcely weighing three pounds and a half, yet it expands a breadth of wing which is five feet from tip to tip. Its bill is very long, being five inches from the point to the base; its claws are long, sharp, and the middlemost toothed like a saw. Yet, thus armed as it appears for war, it is indolent and cowardly, and even flies at the approach of a sparrow-hawk. It was once the amusement of the great to pursue this timorous creature with the falcon: and heron-hawking was so favourite a diversion among our ancestors, that laws were enacted for the preservation of the species; and the person who destroyed their eggs was liable to a penalty of twenty shillings for each offence.

At present, however, the defects of the ill-judged policy of our ancestors, is felt by their posterity; for, as the amusement of hawking has given place to the more useful method of stocking fish-ponds, the heron is now become a most formidable enemy. Of all other birds, this commits the greatest devastation in fresh waters; and there is scarce a fish, though never so large, that he will not strike at and wound, though unable to carry it away. But the smaller fry are his chief subsistence; these, pursued by their larger fellows of the deep, are obliged to take refuge in shallow waters, where they find the heron a still more formidable enemy. His method is to wade as far as he can go into the water, and there patiently wait the approach of his prey, which, when it comes within sight, he darts upon with inevitable aim. In this manner he is found to destroy more in a week than an otter in three months. "I have seen a heron," says Willoughby, "that had been shot, that had seventeen carps in his belly at once, which he will digest in six or seven hours, and then to fishing again. I have seen a carp," continues he, "taken

out of a heron's belly, nine inches and a half long. Several gentlemen who kept tame herons, to try what quantity one of them would eat in a day, have put several smaller roach and dace in a tub; and they have found him eat fifty in a day, one day with another. In this manner a single heron will destroy fifteen thousand carp in half a year.

So great are the digestive powers of this fresh-water tyrant, and so detrimental to those who stock ponds with fish. In general, he is seen taking his gloomy stand by the lake's side, as if meditating mischief, motionless, and gorged with plunder. His usual attitude on this occasion is to sink his long neck between his shoulders, and keep his head turned on one side, as if eyeing the pool more intently. When the call of hunger returns, the toil of an hour or two is generally sufficient to fill his capacious stomach; and he retires long before night to his retreat in the woods. Early in the morning, however, he is seen assiduous at his usual occupation.

But, though in seasons of fine weather the heron can always find a plentiful supply; in cold or stormy seasons, his prey is no longer within reach: the fish that before came into the shallow water, now keep in the deep; as they find it to be the warmest situation. Frogs and lizards also seldom venture from their lurking places; and the heron is obliged to support himself upon his long habits of patience, and even to take up with the weeds that grow upon the water. At those times he contracts a consumptive disposition, which succeeding plenty is not able to remove; so that the meagre glutton spends his time between want and riot, and feels alternately the extremes of famine and excess. Hence, notwithstanding the care with which he takes his prey, and the amazing quantity he devours, the heron is always lean and emaciated; and though his crop be usually found full, yet his flesh is scarcely sufficient to cover the bones.

The heron usually takes his prey by wading into the water; yet it must not be supposed that he does not also take it upon the wing. In fact, much of his fishing is performed in this manner; but he never hovers over deep waters, as there his prey is enabled to escape him by sinking to the bottom. In shallow places he darts with more certainty; for though the fish at sight of its enemy instantly descends, yet the heron, with his long bill and legs, instantly pins it to the bottom, and thus seizes it se-

curely. In this manner, after having been seen with his long neck for above a minute under water, he rises upon the wing, with a trout or an eel struggling in his bill to get free. The greedy bird, however, flies to the shore, scarcely gives it time to expire, but swallows it whole, and then returns to fishing as before.

As this bird does incredible mischief to ponds newly stocked, Willoughby has given a receipt for taking him.—“ Having found his haunt, get three or four small roach or dace, and having provided a strong hook with a wire to it, this is drawn just within-side the skin of the fish, beginning without-side the gills, and running it to the tail, by which the fish will not be killed, but continue for five or six days alive. Then having a strong line made of silk and wire, about two yards and a half long, it is tied to a stone at one end, the fish with the hook being suffered to swim about at the other. This being properly disposed in shallow water, the heron will seize upon the fish to its own destruction. From this method we may learn, that the fish must be alive, otherwise the heron will not touch them, and that this bird, as well as all those that feed upon fish, must be its own caterer; for they will not prey upon such as die naturally, or are killed by others before them.”

Though this bird lives chiefly among pools and marshes, yet its nest is built on the tops of the highest trees, and sometimes on cliffs hanging over the sea. They are never in flocks when they fish, committing their depredations in solitude and silence; but in making their nests they love each other's society; and they are seen, like rooks, building in company with flocks of their kind. Their nests are made of sticks, and lined with wool; and the female lays four large eggs of a pale green colour. The observable indolence of their nature, however, is not less seen in their nestling than in their habits of depredation. Nothing is more certain, and I have seen it a hundred times, than that they will not be at the trouble of building a nest, when they can get one made by the rook, or deserted by the owl, already provided for them. This they usually enlarge and line within, driving off the original possessors, should they happen to renew their fruitless claims.

The French seem to have availed themselves of the indolence of this bird in making its nest; and they actually provide a place

with materials fitted for their nestling, which they call *heronries*. The heron, which with us is totally unfit for the table, is more sought for in France, where the flesh of the young ones is in particular estimation. To obtain this the natives raise up high sheds along some fishy stream ; and furnishing them with materials for the herons to nestle with, these birds build and breed there in great abundance. As soon as the young ones are supposed to be fit, the owner of the heronry comes, as we do into a pigeon-house, and carries off such as are proper for eating ; and these are sold for a very good price to the neighbouring gentry. " These are a delicacy which," as my author says, " the French are very fond of, but which strangers have not yet been taught to relish as they ought." Nevertheless, it was formerly much esteemed as food in England, and made a favourite dish at great tables. It was then said that the flesh of a heron was a dish for a king ; at present nothing about the house will touch it but a cat.

With us, therefore, as the heron, both old and young, is thought detestable eating, we seldom trouble these animals in their heights, which are for the most part sufficiently inaccessible. Their nests are often found in great numbers in the middle of large forests, and in some groves nearer home, where the owners have a predilection for the bird, and do not choose to drive it from its accustomed habitations. It is certain that by their cries, their expansive wings, their bulk, and wavy motion, they add no small solemnity to the forest, and give a pleasing variety to a finished improvement.

When the young are excluded, as they are numerous, voracious, and importunate, the old ones are for ever upon the wing to provide them with abundance. The quantity of fish they take upon this occasion is amazing, and their size is not less to be wondered at. I remember a heron's nest that was built near a school-house ; the boys, with their usual appetite for mischief, climbed up, took down the young ones, sewed up their vents, and laid them in the nest as before. The pain the poor little animals felt from the operation increased their cries ; and this but served to increase the diligence of the old ones in enlarging their supply. Thus they heaped the nest with various sorts of fish, and the best of their kind ; and as their young screamed, they flew off for more. The boys gathered up the fish, which

the young ones were incapable of eating, till the old ones at last quitted their nest; and gave up their brood, whose appetites they found it impossible to satisfy.

The heron is said to be a very long-lived bird; by Mr Keyser's account, it may exceed sixty years; and by a recent instance of one that was taken in Holland, by a hawk belonging to the Stadholder, its longevity is again confirmed, the bird having a silver plate fastened to one leg, with an inscription, importing that it had been struck by the elector of Cologne's hawks thirty-five years before.

CHAP. VI.

OF THE BITTERN, OR MIRE-DRUM.*

THOSE who have walked in an evening by the sedgy sides of unfrequented rivers, must remember a variety of notes from different water-fowl: the loud scream of the wild-goose, the croaking of the mallard, the whining of the lapwing, and the tremulous neighing of the jack-snipe. But of all those sounds, there is none so dismally hollow as the booming of the bittern. It is impossible for words to give those who have not heard this evening-call an adequate idea of its solemnity. It is like the interrupted bellowing of a bull, but hollower, and louder, and is heard at a mile's distance, as if issuing from some formidable being that resided at the bottom of the waters.

The bird, however, that produces this terrifying sound, is not so big as a heron, with a weaker bill, not above four inches long. It differs from the heron chiefly in its colour, which is in general of a paleish yellow, spotted and barred with black. Its wind-pipe is fitted to produce the sound for which it is remarkable; the lower part of it dividing into the lungs, is supplied with a thin loose membrane, that can be filled with a large body of air, and exploded at pleasure. These bellowing explosions are

* *Bitterus* are to be found in all countries where there are marshes. The *Little Bittern* is not much bigger than the thrush, and is rare in Great Britain. The *Yellow Bittern* is an inhabitant of Brazil, and is about two feet, three inches in length.

chiefly heard from the beginning of spring to the end of autumn and, however awful they may seem to us, are the calls to courtship, or of connubial felicity.

From the loudness and solemnity of the note, many have been led to suppose, that the bird made use of external instruments to produce it, and that so small a body could never eject such a quantity of tone. The common people are of opinion, that it thrusts its bill into a reed, that serves as a pipe for swelling the note above its natural pitch; while others, and in this number we find Thomson the poet, imagine that the bittern puts its head under water, and then violently blowing produces its boomings. The fact is, that the bird is sufficiently provided by nature for this call; and it is often heard where there are neither reeds nor waters to assist its sonorous invitations.

It hides in the sedges by day, and begins its call in the evening, booming six or eight times, and then discontinuing for ten or twenty minutes, to renew the same sound. This is a call it never gives but when undisturbed, and at liberty. When its retreats among the sedges are invaded, when it dreads or expects the approach of an enemy, it is then perfectly silent. This call it has never been heard to utter when taken or brought up in domestic captivity; it continues under the control of man a mute forlorn bird, equally incapable of attachment or instruction. But though its boomings are always performed in solitude, it has a scream which is generally heard upon the seizing its prey, and which is sometimes extorted by fear.

This bird, though of the heron kind, is yet neither so destructive nor so voracious. It is a retired timorous animal, concealing itself in the midst of reeds and marshy places, and living upon frogs, insects, and vegetables; and though so nearly resembling the heron in figure, yet differing much in manners and appetites. As the heron builds on the tops of the highest trees, the bittern lays its nest in a sedgy margin, or amidst a tuft of rushes. The heron builds with sticks and wool; the bittern composes its simpler habitation of sedges, the leaves of water-plants, and dry rushes. The heron lays four eggs; the bittern generally seven or eight, of an ash-green colour. The heron feeds its young for many days; the bittern in three days leads its little ones to their food. In short, the heron is lean and cadaverous, subsisting chiefly upon animal food; the bittern is plump

and fleshy, as it feeds upon vegetables, when more nourishing food is wanting.

It cannot be, therefore, from its voracious appetites, but its hollow boom, that the bittern is held in such detestation by the vulgar. I remember, in the place where I was a boy, with what terror this bird's note affected the whole village; they considered it as the presage of some sad event; and generally found or made one to succeed it. I do not speak ludicrously; but if any person in the neighbourhood died, they supposed it could not be otherwise, for the night-raven had foretold it; but if no body happened to die, the death of a cow or a sheep gave completion to the prophecy.

Whatever terror it may inspire among the simple, its flesh is greatly esteemed among the luxurious. For this reason, it is as eagerly sought after by the fowler, as it is shunned by the peasant; and, as it is a heavy-rising slow-winged bird, it does not often escape him. Indeed, it seldom rises but when almost trod upon, and seems to seek protection rather from concealment than flight. At the latter end of autumn, however, in the evening, its wonted indolence appears to forsake it. It is then seen rising in a spiral ascent, till it is quite lost from the view, making at the same time a singular noise, very different from its former boomings. Thus the same animal is often seen to assume different desires; and while the Latins have given the bittern the name of the star-reaching bird, (or the *stellaris*,) the Greeks, taking its character from its more constant habits, have given it the title of the *οκνος*, or the lazy bird.

CHAP. VII.

OF THE SPOONBILL, OR SHOVELER.

As we proceed in our description of the crane kind, birds of peculiar forms offer, not entirely like the crane, and yet not so far different as to rank more properly with any other class. Where the long neck and stilt-legs of the crane are found, they make too striking a resemblance not to admit such birds of the number; and though the bill, or even the toes, should entirely

differ, yet the outlines of the figure, and the natural habits and dispositions, being the same, these are sufficient to mark their place in the general group of nature.

The Spoonbill is one of those birds which differs a good deal from the crane, yet approaches this class more than any other. The body is more bulky for its height, and the bill is very differently formed from that of any other bird whatever. Yet still it is a comparatively tall bird; it feeds among waters; its toes are divided; and it seems to possess the natural dispositions of the crane. The European spoonbill is of about the bulk of a crane; but as the one is above four feet high, the other is not more than three feet three inches. The common colour of those of Europe is a dirty white; but those of America are of a beautiful rose colour, or a delightful crimson. Beauty of plumage seems to be the prerogative of all the birds of that continent; and we here see the most splendid tints bestowed on a bird, whose figure is sufficient to destroy the effects of its colouring; for its bill is so oddly fashioned, and its eyes so stupidly staring, that its fine feathers only tend to add splendour to deformity. The bill, which in this bird is so very particular, is about seven inches long, and running out broad at the end, as its name justly serves to denote, it is there about an inch and a half wide. This strangely fashioned instrument in some is black; in others of a light gray; and in those of America, it is of a red colour, like the rest of the body. All round the upper chap there runs a kind of rim, with which it covers that beneath; and as for the rest, its cheeks and its throat are without feathers, and covered with a black skin.*

* The Spoonbills are voyaging birds, not very wild, and show no aversion to living in a state of captivity. They are found in almost all countries of the old world. In Europe they are seen but seldom in the anterior parts, and are only passagery on some lakes or the banks of rivers. They frequent the marshy coasts of Holland, of Brittany, and of Picardy. They are also seen in Prussia, in Silesia, and in Poland, and in summer they advance as far as West Bothnia and Lapland. They are again to be found on the coasts of Africa, in Egypt, and at the Cape of Good Hope, where they are called *Slangen-wreeter*, that is, serpent-eaters. Commerson has seen them at Madagascar, where the islanders give them the name of *Funguli-am-bara*, which means spade-bill. The negroes in some districts call them *Vang-van*, and in others *Vourou Doulou*, or birds of the devil.

The *White Spoonbill* is an occasional, but rare visitor of this country. They rise very high, and fly in waving lines. Their flesh is tolerably good

A bird so oddly fashioned might be expected to possess some very peculiar appetites ; but the spoonbill seems to lead a life entirely resembling all those of the crane kind ; and Nature, when she made the bill of this bird so very broad, seems rather to have sported with its form, than to aim at any final cause for which to adapt it. In fact, it is but a poor philosophy to ascribe every capricious variety in nature to some salutary purpose : in such solutions we only impose upon each other, and often wilfully contradict our own belief. There must be imperfections in every being, as well as capacities of enjoyment. Between both, the animal leads a life of moderate felicity ; in part making use of its many natural advantages, and in part necessarily conforming to the imperfections of its figure.

The shoveler chiefly feeds upon frogs, toads, and serpents ; of which, particularly at the Cape of Good Hope, they destroy great numbers. The inhabitants of that country hold them in as much esteem as the ancient Egyptians did their bird ibis : the

eating, and is destitute of the oily taste which is peculiar to most shore birds.

The *Roseate Spoonbill* is an American species, and is the *Ajaja* of Brazil (Marcgrave), and the *Tlahquecul* of Fernandez, and *Guirapita* of the natives of Paraguay. Its dimensions are not so great as those of the spoonbill of the ancient continent. The plumage, in general, is of a beautiful rose-colour, while the upper part of the wing and the tail-coverts, are of a lively-red. Age, however, operates the same changes of colour in these spoonbills, as in the red curlew, and in the flamingo, which in their first years are almost completely white or gray. The bill and its membrane are of a yellowish-green, which becomes white when the bird is terrified.

The Spoonbills usually frequent wooded marshes near the mouths of rivers, building in preference upon the taller trees, but where these are wanting taking up their abode among the bushes or even among the reeds. The females usually lay three or four whitish eggs. They associate together, but not in any considerable numbers, and feed upon the smaller fishes and their spawn, shell-fish, reptiles, and other aquatic or amphibious animals. The form and flexibility of their bills are well adapted for burrowing in the mud after their prey ; and the tubercles which are placed on the inside of their mandibles serve both to retain the more slippery animals and to break down their shelly coverings. Their internal conformation, which is in nearly every respect similar to that of the Stork, is admirably suited to this kind of food. They have no proper voice, the lower larynx being destitute of the muscles by which sounds are produced, and their only means of vocal expression consist in the snapping of their mandibles, which they clatter with much precipitation when under the influence of anger or alarm. In captivity they are perfectly tame, living in peace and concord with the other inhabitants of the farm-yard, and rarely exhibiting any symptoms of wildness or desire of change. They feed on all kinds of garbage.

shoveler runs tamely about their houses ; and they are content with its society, as a useful, though a homely, companion. They are never killed ; and, indeed, they are good for nothing when they are dead, for the flesh is unfit to be eaten.

This bird breeds, in Europe, in company with the heron, in high trees ; and in a nest formed of the same materials. Willoughby tells us, that in a certain grove, at a village called Seven Huys, near Leyden, they build and breed yearly in great numbers. In this grove, also, the heron, the bittern, the cormorant, and the shag, have taken up their residence, and annually bring forth their young together. Here the crane kind seem to have formed their general rendezvous ; and, as the inhabitants say, every sort of bird has its several quarter, where none but their own tribe are permitted to reside. Of this grove, the peasants of the country make good profit. When the young ones are ripe, those that farm the grove, with a hook at the end of a long pole, catch hold of the bough on which the nest is built, and shake out the young ones ; but sometimes the nest and all tumble down together.

The shoveler lays from three to five eggs, white, and powdered with a few sanguine or pale spots. We sometimes see, in the cabinets of the curious, the bills of American shovelers, twice as big and as long as those of the common kind among us ; but these birds have not yet made their way into Europe.

CHAP. VIII.

THE FLAMINGO.

THE Flamingo has the justest right to be placed among cranes, and though it happens to be web-footed, like birds of the goose kind, yet its height, figure, and appetites, entirely remove it from that grovelling class of animals. With a longer neck and legs than any other of the crane kind, it seeks its food by wading among waters, and only differs from all of this tribe in the manner of seizing its prey ; for as the heron makes use of its claws, the flamingo uses only its bill, which is strong and thick for the purpose, the claws being useless, as they are feeble, and webbed like those of water-fowl.

The flamingo is the most remarkable of all the crane kind, the tallest, bulkiest, and the most beautiful. The body, which is of a beautiful scarlet, is no bigger than that of a swan ; but its legs and neck are of such an extraordinary length, that, when it stands erect, it is six feet six inches high. Its wings, extended, are five feet six inches from tip to tip ; and it is four feet eight inches from tip to tail. The head is round and small, with a large bill, seven inches long, partly red, partly black, and crooked like a bow. The legs and thighs, which are not much thicker than a man's finger, are about two feet eight inches high ; and its neck near three feet long. The feet are not furnished with sharp claws, as in others of the crane kind ; but feeble, and united by membranes, as in those of the goose. Of what use these membranes are does not appear, as the bird is never seen swimming, its legs and thighs being sufficient for bearing it into those depths where it seeks for prey.

This extraordinary bird is now chiefly found in America ; but it was once known on all the coasts of Europe. Its beauty, its size, and the peculiar delicacy of its flesh, have been such temptations to destroy or take it, that it has long since deserted the shores frequented by man, and taken refuge in countries that are as yet but thinly peopled. In those desert regions, the flamingoes live in a state of society, and under a better polity than any other of the feathered creation.

When the Europeans first came to America, and coasted down along the African shores, they found the flamingoes on several shores on either continent, gentle, and no way distrustful of mankind.¹ They had long been used to security, in the extensive solitudes they had chosen ; and knew no enemies but those they could very well evade or oppose. The Negroes and the native Americans were possessed but of few destructive arts for killing them at a distance ; and when the bird perceived the arrow, it well knew how to avoid it. But it was otherwise when the Europeans first came among them ; the sailors, not considering that the dread of fire-arms was totally unknown in that part of the world, gave the flamingo the character of a foolish bird, that suffered itself to be approached and shot at. When the fowler had killed one, the rest of the flock, far from attempt-

¹ Albin's New History of Birds.

ing to fly, only regarded the fall of their companion in a kind of fixed astonishment; another and another shot was discharged; and thus the fowler often levelled the whole flock, before one of them began to think of escaping.

But at present it is very different in that part of the world; and the flamingo is not only one of the scarcest, but of the shyest birds in the world, and the most difficult of approach. They chiefly keep near the most deserted and inhospitable shores, near salt-water lakes and swampy islands. They come down to the banks of rivers by day; and often retire to the inland mountainous parts of the country at the approach of night. When seen by mariners in the day, they always appear drawn up in a long close line of two or three hundred together; and, as Dampier tells us, present at the distance of half a mile, the exact representation of a long brick wall. Their rank, however, is broken when they seek for food; but they always appoint one of the number as a watch, whose only employment is to observe and give notice of danger, while the rest are feeding. As soon as this trusty centinel perceives the remotest appearance of danger, he gives a loud scream, with a voice as shrill as a trumpet, and instantly the whole cohort are upon the wing. They feed in silence; but upon this occasion, all the flock are in one chorus, and fill the air with intolerable screamings.

From this it appears, that the flamingoes are very difficult to be approached at present, and that they avoid mankind with the most cautious timidity; however, it is not from any antipathy to man that they shun his society, for in some villages, as we are assured by Labat, along the coasts of Africa, the flamingoes come in great numbers to make their residence among the natives. There they assemble by thousands, perched on the trees, within and about the village; and are so very clamorous, that the sound is heard at near a mile's distance. The Negroes are fond of their company; and consider their society as a gift of Heaven, as a protection from accidental evils. The French, who are admitted to this part of the coast, cannot, without some degree of discontent, see such a quantity of game untouched, and rendered useless by the superstition of the natives: they now and then privately shoot some of them, when at a convenient distance from the village, and hide them in the long grass, if they perceive any of the Negroes approaching; for they would proba-

bly stand a chance of being ill used, if the blacks discovered their sacred birds thus unmercifully treated.

Sometimes, in their wild state, they are shot by mariners, and their young which run excessively fast, are often taken. Labat has frequently taken them with nets, properly extended round the places they breed in. When their long legs are entangled in the meshes, they are then unqualified to make their escape: but they still continue to combat with their destroyer; and the old ones, though seized by the head, will scratch with their claws; and these, though seemingly inoffensive, very often do mischief. When they are fairly disengaged from the net, they nevertheless preserve their natural ferocity: they refuse all nourishment; they peck, and combat with their claws, at every opportunity. The fowler is, therefore, under a necessity of destroying them, when taken; as they would only pine and die, if left to themselves in captivity.

The flesh of the old ones is black and hard; though, Dampier says, well-tasted: that of the young ones is still better. But of all other delicacies, the flamingo's tongue is the most celebrated. "A dish of flamingoes' tongues," says our author, "is a feast for an emperor." In fact, the Roman emperors considered them as the highest luxury; and we have an account of one of them, who procured fifteen hundred flamingoes' tongues to be served up in a single dish. The tongue of this bird, which is so much sought after, is a good deal larger than that of any other bird whatever. The bill of the flamingo is like a large black box, of an irregular figure, and filled with a tongue which is black and gristly; but what peculiar flavour it may possess, I leave to be determined by such as understand good eating better than I do. It is probable, that the beauty and scarcity of the bird might be the first inducements to studious gluttony to fix upon its tongue as meat for the table. What Dampier says of the goodness of its flesh, cannot so well be relied on; for Dampier was often hungry, and thought any thing good that could be eaten: he avers, indeed, with Labat, that the flesh is black, tough, and fishy; so that we can hardly give him credit, when he asserts, that its flesh can be formed into a luxurious entertainment.

These birds as was said, always go in flocks together; and they move in rank, in the manner of cranes. They are some-

times seen, at the break of day, flying down in great numbers from the mountains, and conducting each other with a trumpet cry, that sounds like the word *Tococo*, from whence the savages of Canada have given them the name. In their flight they appear to great advantage ; for they then seem of as bright a red as a burning coal. When they dispose themselves to feed, their cry ceases ; and then they disperse over a whole marsh, in silence and assiduity. Their manner of feeding is very singular : the bird thrusts down its head, so that the upper convex side of the bill shall only touch the ground ; and in this position the animal appears, as it were, standing upon its head. In this manner it paddles and moves the bill about, and seizes whatever fish or insect happens to offer. For this purpose the upper chap is notched at the edges, so as to hold its prey with the greater security. Catesby, however, gives a different account of their feeding. According to him, they thus place the upper chap undermost, and so work about, in order to pick up a seed from the bottom of the water, that resembles millet : but as in picking up this they necessarily also suck in a great quantity of mud, their bill is toothed at the edges in such a manner as to let out the mud while they swallow the grain.

Their time of breeding is according to the climate in which they reside : in North America they breed in our summer ; on the other side of the line, they take the most favourable season of the year. They build their nests in extensive marshes, and where they are in no danger of a surprise. The nest is not less curious than the animal that builds it : it is raised from the surface of the pool about a foot and a half, formed of mud scraped up together, and hardened by the sun, or the heat of the bird's body ; it resembles a truncated cone, or one of the pots which we see placed in chimneys ; on the top it is hollowed out to the shape of the bird, and in that cavity the female lays her eggs, without any lining but the well-cemented mud that forms the sides of the building. She always lays two eggs, and no more ; and, as her legs are immoderately long, she straddles on the nest, while her legs hang down, one on each side, into the water.

The young ones are a long while before they are able to fly ; but they run with amazing swiftness. They are sometimes caught ; and, very different from the old ones, suffer themselves to be carried home, and are tamed very easily. In five or six

days they become familiar, eat out of the hand, and drink a surprising quantity of sea-water. But though they are easily rendered domestic, they are not reared without the greatest difficulty: for they generally pine away, for want of their natural supplies, and die in a short time. While they are yet young, their colours are very different from those lively tints they acquire with age. In their first year they are covered with plumage of a white colour, mixed with gray: in the second year the whole body is white, with here and there a slight tint of scarlet; and the great covert feathers of his wings are black; the third year the bird acquires all its beauty; the plumage of the whole body is scarlet, except some of the feathers in the wings, that still retain their sable hue. Of these beautiful plumes the savages make various ornaments; and the bird is sometimes skinned by the Europeans, to make muffs. But these have diminished in their price, since we have obtained the art of dying feathers of the brightest scarlet.

CHAP. IX.

THE AVOSETTA, OR SCOOPER; AND THE CORRIRA, OR RUNNER.

THE extraordinary shape of the Avosetta's bill might incline us to wish for its history; and yet in that we are not able to indulge the reader. Natural historians have hitherto, like ambitious monarchs, shown a greater fondness for extending their dominions, than cultivating what they possess. While they have been labouring to add new varieties to their catalogues, they have neglected to study the history of animals already known.

The avosetta is chiefly found in Italy, and now and then comes over into England. It is about the size of a pigeon, is a pretty upright bird, and has extremely long legs for its size. But the most extraordinary part of its figure, and that by which it may be distinguished from all others of the feathered tribe, is the bill, which turns up like a hook, in an opposite direction to that of the hawk or the parrot. This extraordinary bill is black, flat, sharp, and flexible at the end, and about three inches and a half long. From its being bare a long way above the knee, it

appears that it lives and wades in the waters. It has a chirping pert note, as we are told ; but with its other habits we are entirely unacquainted. I have placed it, from its slender figure, among the cranes ; although it is web-footed, like the duck. It is one of those birds of whose history we are yet in expectation.*

To this bird of the crane kind, so little known, I will add another, still less known ; the Corrira, or Runner, of Aldrovandus. All we are told of it is, that it has the longest legs of all web-footed fowls, except the flamingo and avosetta ; that the bill is straight, yellow, and black at the ends ; that the pupils of the eyes are surrounded with two circles, one of which is bay, and the other white : below, near the belly, it is whitish ; the tail, with two white feathers, black at the extremities : and that the upper part of the body is of the colour of rusty iron. It is thus that we are obliged to substitute dry description for instructive history ; and employ words to express those shadings of colour which the pencil alone can convey.

CHAP. X.

SMALL BIRDS OF THE CRANE KIND, WITH THE THIGHS PARTLY BARE OF FEATHERS.

As I have taken my distinctions rather from the general form and manners of birds, than from their minuter though perhaps more precise discriminations, it will not be expected that I

* The Avosets of Europe and America prefer cold and temperate climates to hot countries. Their migrations are determined by the want or abundance of food. In winter they assemble in small flocks of six or seven, and frequent our shores, especially the mouths of large muddy rivers, in search of worms and marine insects. These they scoop out of the mud with their recurved bills, which are admirably adapted for that purpose, being tough and flexible like whalebone. The feet seem calculated for swimming, but they are never observed to take the water : it is therefore probable, that they are furnished with a web merely to prevent their sinking into the mud. The female lays two eggs, about the size of those of a pigeon, of a white colour tinged with green, and marked with large black spots. It is said to be very tenacious of its young, and when disturbed at this season, will fly round in repeated circles, uttering a note that resembles the word *twit-twit*.

should here enter into a particular history of a numerous tribe of birds, whose manners and forms are so much alike. Of many of them we have scarcely any account in our historians, but tedious descriptions of their dimensions, and the colour of their plumage; and of the rest, the history of one is so much that of all, that it is but the same account repeated to a most disgusting reiteration. I will therefore groupe them into one general draught; in which the more eminent, or the most whimsical, will naturally stand forward on the canvass.

In this tribe we find an extensive tribe of native birds, with their varieties and affinities; and we might add a hundred others, of distant climates, of which we know little more than the colour and the name. In this list is exhibited the Curlew, a bird of about the size of a duck, with a bill four inches long: the Woodcock, about the size of a pigeon, with a bill three inches long: the Godwit, of the same size; the bill four inches: the Green Shank, longer legged; the bill two inches and a half: the Red Shank, differing in the colour of its feet from the former: the Snipe, less by half, with a bill three inches. Then with shorter bills—The Ruff, with a collar of feathers round the neck of the male: the Knot, the Sandpiper, the Sanderling, the Dunlin, the Purre, and the Stint. To conclude: with bills very short—The Lapwing, the Green Plover, the Gray Plover, the Dottrel, the Turnstone, and the Sea-lark. These, with their affinities, are properly natives or visitants of this country; and are dispersed along our shores, rivers, and watery grounds. Taking in the birds of this kind, belonging to other countries, the list would be very widely extended; and the whole of this class, as described by Brisson, would amount to near a hundred.*

* We shall here notice more particularly the birds above enumerated.

The Curlew.—There are two species of the Curlew to be found in Europe—the Common Curlew and the Little Curlew, but there are various other species, in Asia, Africa, and America, differing very much in size, the longest measuring about twenty-five inches, and sometimes weighing thirty-six ounces. These birds fly in considerable flocks, and are well known upon the sea-coasts in most parts, where, and in the marshes, they frequent in winter. They feed on worms, frogs, and all kinds of marine insects. In April, or the beginning of May, they retire into mountainous and unfrequented parts on the sea-shore, where they breed; and do not return again till the approach of winter. There have been some advocates in favour of the flesh of this bird, but in general it is strong and fishy. It has a long black bill, much curved or arched, about eight fingers long, and beginning

All these birds possess many marks in common ; though some have peculiarities that deserve regard. All these birds are bare of feathers above the knee, or above the heel, as some naturalists choose to express it. In fact, that part which I call the knee,

to bend a little downwards about three fingers from the head. The middle parts of the feathers on the head, neck, and back, are black ; the borders or outsides ash-coloured, with an intermixture of red ; and those between the wings and back are of a most beautiful glossy blue, and shine like silk. The vent and belly are white. The feet are divided, but joined by a little membrane at the root. The tongue is very short, considering the length of the bill, and bears some resemblance to an arrow. The female is somewhat larger than the male, which is commonly called the jack-curlew ; and the spots with which her body is covered almost over, is more inclining to a red.

The Woodcock.—During the summer time the woodcock is an inhabitant of Norway, Sweden, Lapland, and other northern countries, where it breeds. As soon, however, as the frosts commence, it retires southward to milder climates. These birds arrive in Great Britain in flocks ; some of them in October, but not in great numbers till November and December. They generally take advantage of the night, being seldom seen to come before sun-set.

The time of their arrival depends considerably on the prevailing winds ; for adverse gales always detain them, they not being able to struggle with the boisterous squalls of the Northern Ocean. After their arrival in bad weather, they have often been seen so much exhausted as to allow themselves to be taken by the hand, when they alighted near the coast. They live on worms and insects, which they search for with their long bills in soft ground and moist woods, feeding and flying principally in the night. They go out in the evening ; and generally return in the same direction, through the same glades, to their day-retreat. The greater part of them leave this country about the latter end of February, or the beginning of March, always pairing before they set out. They retire to the coast, and, if the wind be fair, set out immediately ; but if contrary, they are often detained in the neighbouring woods and thickets for some time. In this crisis the sportsmen are all on the alert, and the whole surrounding country echoes to the discharge of guns ; seventeen brace have been killed by one person in a day. But if they are detained long on the dry heaths, they become so lean as to be scarcely eatable. The instant a fair wind springs up, they seize the opportunity ; and where the sportsman has seen hundreds in one day, he will not find even a single bird the next.

Very few of them breed in England ; and perhaps with respect to those that do, it may be owing to their having been wounded by the sportsman in the winter, so as to be disabled from taking their long journey in the spring. They build their nests on the ground, generally at the root of some tree, and lay four or five eggs about the size of those of a pigeon, of a rusty colour, and marked with brown spots. They are remarkably tame during incubation. A person who discovered a woodcock on its nest, often stood over, and even stroked it ; notwithstanding it hatched the young ones, and in due time, disappeared with them.

if compared with the legs of mankind, is analogous to the heel ; but as it is commonly conceived otherwise, I have conformed to the general apprehension. I say, therefore, that all these birds are bare of feathers above the knee ; and in some they are want-

We have a very correct account of the migration of the woodcock in the following extract from Warner's Tour through Cornwall.

“ Before I quit the Lands-end it may be amusing to mention a particular of its natural history, which I think throws some light on the much disputed subject of the *migration* of English birds. You are aware, perhaps, that a controversy has long subsisted between ornithologists, whether these birds, which are seen amongst us at particular seasons, remain in the kingdom concealed in undiscoverable recesses during the period of their disappearance, or whether they are actually absent from our climate at this time, and resident in countries more congenial to their nature and instincts. In this list of migratory birds, as they are called, the woodcock, that important article of luxury and sport, is enumerated. Mr Daines Barrington, amongst others, is a strenuous opponent to the doctrine of this species of bird making a periodical passage from England to other countries ; contending that it builds its nest, and breeds amongst us, in the same manner as other indigenous British birds ; and is invisible during the summer only from the caution of its habits, and privacy of its retreats, in season. He further makes the assertion with respect to migratory birds in general, that there is no well-attested instance of such migration actually taking place, which he considers as a convincing negative proof of the falsehood of that opinion. What the value of these examples of migration may be, which are adduced by Willoughby, Buffon, Adanson, &c. I know not, as I have never paid any attention to the controversy ; but I will venture to assert, that had Mr Daines Barrington made the question, with respect to woodcocks, a subject of his inquiry when he was in Cornwall, he would have learned a fact at the Lands-end, which must have at once settled scepticism on that particular head. He would here have been told by every peasant and fisherman, that the annual periodical arrival of the woodcocks from the Atlantic, at the close of the year, is as naturally expected, and as surely takes place, as the return of winter and autumn ; and that the time of their visit is directed by so certain an instinct, that the inhabitants can tell, by the temperature of the air, the week, if not the day, on which they will arrive. He would have been convinced that migration is the general habit of the *species*, and not the wayward act of an individual bird, by the prodigious flocks of them which reach the shore at the same time ; and no doubt would have remained on his mind of their coming from Asar, when he had been told, that after their arrival, they might, for a day or two, be easily knocked down, or catched by dogs, from the extreme exhaustion induced by their flight. A short respite indeed amongst the bushes and stones of the Lands-end again invigorates them, and enables them to take an inland course ; but till they are thus recruited, they are an easy prey, and produce no mean profit to those who live in the neighbourhood of this place, at their first landing in England. We were told at Truro, as a proof of the definitive time of their arrival, that a gentleman there had sent to the Lands-end for several brace, to be forwarded to him for a particular occasion. His corres-

ing half way up the thigh. The nudity in that part, is partly natural, and partly produced by all birds of this kind habitually wading in water. The older the bird, the barer are its thighs; yet even the young ones have not the same downy covering

pendent acquainted him in answer, that no woodcocks had yet arrived; but that on the third day from his writing, if the weather continued as it then was, there would be plenty. The state of the atmosphere remained unchanged, the visitors came as it was asserted they would, and the gentleman received the number of birds he had ordered.—From all these circumstances we concluded, that woodcocks are actually migratory birds, that they retire from England when the temperature of our climate becomes too warm for them, take their flight to more northerly regions, and return to our coast as soon as the cold of these higher latitudes render it displeasing for them to remain."

The *Snipes*, though agreeing very much in external resemblance with the woodcocks, differ from them in natural habits. They do not inhabit woods, but remain in the marshy parts of meadows, in the herbage, and amongst the osiers which are on the banks of rivers. They are still more generally spread than the woodcocks, and there are no portions of the globe in which some of them have not been found. They are observed to be incessantly employed in picking the ground, and Aldrovandus has remarked that they have the tongue terminating in a sharp point, proper for piercing the small worms, which, probably, constitute their food; for though nothing is found in their stomachs but liquid, and an earthy sediment, it must be that such soft bodies as worms, &c. dissolve there very quickly, and that the earth which enters along with them, is the only substance unsusceptible of liquefaction.

Autumn is the season for the arrival of the common snipe in most of the southern and western countries of Europe. It then extends through meadows, marshes, bogs, and along the banks of streams and rivers. When it walks, it carries the head erect, without either hopping or fluttering, and gives it a horizontal movement, while the tail moves up and down. When it takes flight, it rises so high as often to be heard after it is lost sight of. Its cry has been sometimes likened to that of the she-goat.

The snipes for the most part, migrating northwards, in the spring, nestle in Germany, Switzerland, Silesia, &c. Some, however, continue in their more southern stations, making their nest in the month of June, under the root of some alder or willow, in a sheltered place. This nest is composed of dry plants and feathers, and the female lays four or five oblong eggs, of a whitish tint, spotted with red. If the female be disturbed during incubation, she rises very high, and in a right line, then utters a particular cry, and re-descends with great rapidity. While the female is hatching, the male is frequently observed to hover around her, uttering a kind of hissing noise. The young quit the nest on issuing from the shell, and then appear very ugly and deformed. Until their bill grows firm, the mother continues her care of them, and does not leave them until they can do without her.

The snipe usually grows very fat, both in Europe and North America; but much less so in warm climates. Its flesh, after the early frosts, acquires a fine and delicate flavour. It is cooked, as well as the woodcock, without

reaching so low as the birds of any other class. Such a covering there would rather be prejudicial, as being continually liable to get wet in the water.

As these birds are usually employed rather in running than in

being drawn, and is in universal estimation as an exquisite game. It is caught in various ways, and is well known to be a difficult shot, when turning and winding in the air; though by no means so when suffered to proceed in a right line, especially as the smallest grain of lead is sufficient to bring it down, and the slightest touch will make it fall.

The *Double Snipe* was considered by Buffon as a mere variety of the common, as that naturalist probably took into consideration only its superior size, and the trifling difference of the plumage. It has, however, since his time, been ascertained to be a different species. It differs from the common snipe in its cry, in its flight, which is generally direct, and with few or no circlings, and in its habits, preferring to marshy and muddy grounds, those places where there is but little water, and where it is clear. There is little else worth remarking concerning it.

The *Little Snipe* is not larger than a lark. It is less generally extended than the common species. In France, it remains in the marshes almost during the whole year, where it nestles and lays eggs, like those of the common snipe. Concealed in reeds and rushes, it remains there so pertinaciously that it is necessary almost to walk upon it to make it rise. Its flight is less rapid and more direct than that of the common snipe. Its fat is equally fine, and its flesh similarly well-flavoured. It is not very common in this country.

There is a number of other species of woodcock and snipe, but there is nothing in their habits to induce us to exceed the limits to which we are necessarily prescribed in this portion of our work.

The *Godwits* are to be distinguished from the foregoing. The woodcocks, properly so called, inhabit woods. The snipes live in fresh water marshes; but the godwits prefer the sea-shore. The passage of the last into the temperate climates of Europe takes place in September, and, for their short stay, they frequent salt marshes, where like the snipes, &c. they live on small worms, which they draw out of the mud. Those which are sometimes to be met with in inland places, have doubtless been driven there by the wind. Mauduyt, who observed some of them exposed for sale in the Parisian markets, in spring, concluded, and justly, that they make a second passage in spring, and not that they ever nestle on the French coasts. These timid birds, whose sight moreover is weak, remain in the shade during the day-time, and it is only by evening twilight, or early dawn, that they proceed in search of food, for the discrimination of which their bill is particularly fitted. Little stones are sometimes found in their gizzard, but we cannot conclude that these hard substances answer with them, as with the gallinæ, for the trituration of their food, which is too soft to require any thing of the kind, but rather that they have been taken in along with it.

These birds are particularly wild, and fly precipitately from the slightest appearance of danger, uttering a cry which Belon compares to the smothered bleating of a she-goat. At the time of their arrival they are seen in

flying, and as their food lies entirely upon the ground, and not on trees or in the air, so they run with great swiftness for their size, and the length of their legs assists their velocity. But, as in seeking their food, they are often obliged to change

flocks, and often heard, passing very high, in the evening or by moonlight. But the moment they alight, they are so much fatigued that they resume their flight with much difficulty; at such times, though they run with swiftness they can be easily turned, and sufficient numbers driven together to enable the fowler to kill several of them with a single shot. They remain but a short time at one place, and it is not uncommon to find them no longer in the morning, in those marshes, where, the preceding evening, they had been extremely numerous. Their flesh is excellent eating.

The *Sanderlings* are found in Europe, in Asia, in North America, and in New South Wales. They inhabit the sea-shores, and abound, in spring and autumn, both on the coasts of Holland and of this country. They are only seen accidentally in countries remote from the sea. There is but one species; but as these birds, which undergo two moultings, are most frequently seen in their summer plumage, in which red, or reddish, is the predominant colour, while in the winter it is gray, it is not wonderful that naturalists have made a distinct species under the title of *Charadrius Rubidus*. The sanderlings traverse in their periodical migrations a large portion of the globe. But they are only seen accidentally along rivers, which leads to the presumption that their aliment consists of small marine worms and insects. They breed in the North

The *Sea Larks*, a name exceedingly improper, as tending to the confusion of two genera so widely remote, never quit the edge of waters, and especially prefer the sea-shore, although they occasionally remove to a considerable distance from it, since they are frequently seen around the lakes and along the rivers of the Vosges and the Pyrenees. They are birds of passage, at least in many countries of Europe. They proceed very far to the north; for they are found in Sweden, on the borders of the Caspian Sea, and throughout the whole of Siberia. During winter they are very common both in France and England. The species is named by Latham, *Purpe Sandpiper*. Except during the nestling time, these birds unite in flocks, often so crowded, that a great number of them may be killed by a single shot. Nothing, says Belon, is more wonderful concerning this little bird, than to see five or six hundred dozens of them brought, on a single Saturday, in winter, to the Paris market. They constitute an excellent game, but must be eaten fresh; they are not, however, destitute of that oily taste, which appertains to almost all species of aquatic birds.

The *Plovers* habitually frequent the sea-coast, the mouths of rivers, and salt marshes. They feed upon crustacea, and small molluscous animals, which they catch in the sand along the line of waters, over which they are seen continually flying, uttering a little cry. Many species live solitarily, or in couples; some others in small flocks. These birds are to be found in almost all the countries of the globe, from the equator to the coldest latitudes of the northern and southern hemispheres. They are all clad in sombre colours, the distribution of which is, however, not unpleasing. Most of them undergo a double moulting, and are vested in various liveries, accord-

their station ; so also are they equally swift of wing, and traverse immense tracts of country without much fatigue.

It has been thought by some, that a part of this class lived upon an oily slime, found in the bottoms of ditches and of weedy

ing to age and sex. Some species have spines, which serve as defensive weapons, attached to their wings ; some others have fleshy appendages at the base of the bill. The plovers emigrate every year, in flocks of greater or less numbers, and this principally takes place in autumn, during the rainy season, whence their French name (*pluviers*) is derived, and of which our word plover is an obvious corruption. At this time they are seen in the greatest abundance. They do not remain quiet when on the ground, but are seen in incessant motion. They fly in an extended file, or in transverse zones, very narrow and of a great length. Their flesh is delicate and much esteemed. They are frequently taken, in great quantities, in the countries where they are common, by means of nets variously fabricated.

Of these, the first and most common is the *Golden Plover*. This bird frequents humid and marshy grounds. In winter it is very common on the coasts of France and Holland. It is found in England during the entire year ; it is also very abundant in the Highlands of Scotland, in the Western Islands, and in the Isle of Man. It is again found in America, in Asia, and in the islands of the South Sea. Throughout the north of Europe it is common, and in all parts of Germany, Italy, and Spain. From the latter country we trace it into Barbary, and other parts of Africa ; and it is to be found as far to the south-east of Asia, as India, China, and the Archipelago of the Eastern Ocean. These birds lay from three to five eggs, of rather an olive-green colour, with black spots. They live on worms, insects, and larvæ. There is very little difference in appearance between the male and female.

These plovers strike the earth with their feet to cause the worms, &c., to issue from their retreat. In the morning, like the lapwings and the snipes, they visit the water side to wash their bills and feet. They are rarely seen longer than twenty-four hours in the same place, which doubtless proceeds from their numbers, which cause a rapid exhaustion of their means of subsistence in any given spot. They migrate from the districts which they inhabit when the snow falls and the frost begins to be intense, as their resources of provision are then cut off, and they are deprived of the water, which their constitution renders indispensable to them. It is very rare to see a golden plover alone, and Belon tells us that the smallest flocks in which they fly amount at least to fifty each. When they are seeking their food, several of them act as sentinels, and on the appearance of any danger, set up a shrill cry, as a warning to the others, and a signal for flight. These flocks disperse in the evening, and each individual passes the night apart ; but at the dawn of day, the first that awakes gives a cry of appeal to the rest, which immediately re-assemble on this call. This cry is imitated by the fowlers to draw these birds into their nets. The flesh of these plovers is in high estimation, in general, though the peculiarity of its flavour does not equally please every palate. It is best when the birds are rather fat than otherwise.

The Dotterel Plover.—The length of this bird is about nine inches. Its

pools; they were thence termed, by Willoughby, *Mudsuckers*. But later discoveries have shown that, in these places, they hunt for the caterpillars and worms of insects. From hence, therefore, we may generally assert, that all birds of this class

bill is black; the cheeks and throat are white; the back and wings are of a light brown, inclining to olive; the breast is of a dull orange: the belly, thighs, and vent are of a reddish white; the tail is of an olive brown, and tipped with white; the legs are of a dark olive colour. The dotterel is common in various parts of Great Britain, though in some places it is scarcely known. They are supposed to breed in the mountains of Cumberland and Westmoreland, where they are sometimes seen in the month of May, during the breeding season; they likewise breed on several of the Highland hills. They are very common in Cambridgeshire, Lincolnshire, and Derbyshire, appearing in small flocks on the heaths and moors of these counties during the months of May and June; and are then very fat, and much esteemed for the table. This bird is remarkable for its stupidity.

The Redshank.—This bird weighs about five ounces and a half; its length is twelve inches, and the breadth twenty-one. The bill, from the tip to the corners of the mouth, is more than an inch and three quarters long, black at the point, and red towards the base: the feathers on the crown of the head are dark brown, edged with pale rufous; a light or whitish line passes over, and encircles each eye, from the corners of which a dark brown spot is extended to the beak: irides hazel: the hinder part of the neck is obscurely spotted with dark brown, or a rusty ash coloured ground; the throat and fore-part are more distinctly marked in streaks of the same colour: on the breast and belly, which are white tinged with ash, the spots are thinly distributed, and are shaped something like the heads of arrows or darts.

The Spotted Redshank.—The length of this bird, from the tip of the bill to the end of the tail, is twelve inches, and to the end of the toes fourteen inches and a half; its breadth twenty-one inches and a quarter; and its weight above five ounces avoirdupois. The bill is slender, measures two inches and a half from the corners of the mouth to the tip, and is, for half its length nearest the base, red; the other part black: irides hazel; the head, neck, breast, and belly, are spotted in streaks, mottled and barred with dingy ash brown and dull white, darker on the crown and hinder part of the neck; the throat is white; and lines of the same colour pass from the upper sides of the beak over each eye, from the corners of which two brown ones are extended to the nostrils. The ground colour of the shoulders, scapulars, lesser coverts, and tail, is a glossy olive brown; the feathers on all these parts are indented on the edges, more or less, with triangular-shaped white spots. The back is white: the rump barred with waved lines of ash-coloured brown, and dingy white: the vent feathers are marked nearly in the same manner, but with a greater portion of white: the tail and coverts are also barred with narrow waved lines of a dull ash-colour, and, in some specimens, are nearly black and white. Five of the primary quills are dark brown, tinged with olive; the shaft of the first quill is white; the next six are, in the male, rather deeply tipped with white, and slightly spotted and barred with brown: the secondaries, as far as they are uncover-

live upon animals of one kind or another. The long-billed birds suck up worms and insects from the bottom; those furnished with shorter bills, pick up such insects as lie nearer the surface of the meadow, or among the sands on the sea-shore.

ed when the wings are extended, are of the same snowy whiteness as the back. The feathers which cover the upper part of the thighs, and those near them, are blushed with a reddish or vinous colour: the legs are of a deep orange red, and measure, from the end of the middle toe-nail to the upper bare part of the thigh, five inches and a half.

The Green Sandpiper.—This bird measures about ten inches in length, to the end of the toes nearly twelve, and weighs about three ounces and a half. The bill is black, and an inch and a half long: a pale streak extends from it over each eye; between which, and the corners of the mouth, there is a dusky patch. The crown of the head, and the hinder part of the neck, are of a dingy, brownish ash-colour; in some specimens narrowly streaked with white. The throat is white; fore-part of the neck mottled or streaked with brown spots on a white or pale ash-coloured ground. The whole upper part of the plumage is of a glossy bronze, or olive brown, elegantly marked on the edge of each feather with small roundish white spots: the quills are without spots, and are of a darker brown: the secondaries and tertials are very long: the insides of the wings are dusky, edged with white gray; and the inside coverts next the body are curiously barred, from the shaft of each feather to the edge, with narrow white lines, formed nearly of the shape of two sides of a triangle. The belly, vent, tail coverts, and tail, are white; the last broadly barred with black, the middle feathers having four bars, and those next to them decreasing in the number of bars towards the outside feathers, which are quite plain: the legs are green.

The Dunlin.—This is the size of a jack-snipe. The upper parts of the plumage is ferruginous, marked with large spots of black and a little white; the lower parts are white, with dusky streaks. It is found in all the northern parts of Europe.

The Lapwing or Peewit.—This bird is about the size of a common pigeon, and is covered with very thick plumes, which are black at the roots, but of a different colour on the outward part. The feathers on the belly, thighs, and under the wings, are most of them white as snow; and the under part on the outside of the wings white, but black lower. It has a great liver, divided into two parts; and, as some authors affirm, no gall. Lapwings are found in most parts of Europe, as far northward as Iceland. In the winter they are met with in Persia and Egypt. Their chief food is worms; and sometimes they may be seen in flocks nearly covering the low marshy grounds in search of these, which they draw with great dexterity from their holes. When the bird meets with one of these little clusters of pellets, or rolls of earth that are thrown out by the worm's perforations, it first gently removes the mud from the mouth of the hole, then strikes the ground at the side with its foot, and steadily and attentively waits the issue; the reptile, alarmed by the shock, emerges from its retreat, and is instantly seized. These birds make a great noise with their wings when flying; and are called pee-wits, in Scotland and the north of England, from their particular cry. In other parts of the island, they are called green plovers. They

Thus the curlew, the woodcock, and the snipe, are ever seen in plashy brakes, and under covered hedges, assiduously employed in seeking out insects in their worm state; and it seems, from their fatness, that they find a plentiful supply. Nature, indeed, has furnished them with very convenient instruments for procuring their food. Their bills are made sufficiently long for searching; but still more, they are endowed with an exquisite sensibility at the point, for feeling their provision. They are furnished with no less than three pair of nerves, equal almost to the optic nerves in thickness; which pass from the roof of the mouth, and run along the upper chap to the point.

Nor are those birds with shorter bills, and destitute of such convenient instruments, without a proper provision made for their subsistence. The lapwing, the sandpiper, and the red-shank, run with surprising rapidity along the surface of the marsh or the sea-shore, quarter their ground with great dexterity, and leave nothing of the insect kind that happens to lie on the surface. These, however, are neither so fat nor so delicate as the

remain here the whole year. The female lays two eggs on the dry ground, near some marsh, upon a little bed which it prepares of dry grass: these are olive-coloured, and spotted with black. She sits about three weeks; and the young, who are covered with a thick down, are able to run two or three days after they are hatched.

The Turnstone.—Is about the size of a thrush; the bill is nearly an inch long, and turns a little upwards. The head, throat, and belly, are white: the breast black; and the neck encircled with a black colour. The upper parts of the plumage are of a pale reddish brown. These birds take their name from their method of finding their food, which is by turning up small stones with their bills to get the insects that lurk under them.

The Whimbrel.—The whimbrel is only about half the size of the curlew, which it very nearly resembles in shape, the colours of its plumage, and manner of its living. It is about seventeen inches in length, and twenty-nine in breadth; and weighs about fourteen ounces. The bill is about three inches long; the upper mandible black, the under one pale red. The upper part of the head is black, divided in the middle of the crown by a white line from the brow to the hinder part; between the bill and the eyes there is a darkish oblong spot; the sides of the head, the neck, and breast, are of a pale brown, marked with narrow dark streaks pointing downwards; the belly is of the same colour, but the dark streaks upon it are larger; about the vent it is quite white; the lower part of the back is also white. The rump and tail feathers are barred with black and white; the shafts of the quills are white, the outer webs totally black, but the inner ones marked with large white spots: the secondary quills are spotted in the same manner on both the inner and outer webs. The legs and feet are of the same shape and colour as those of the curlew.

former; as they are obliged to toil more for a subsistence, they are easily satisfied with whatever offers; and their flesh often contracts a relish of what has been their latest, or their principal food.

Most of the birds formerly described, have stated seasons for feeding and rest: the eagle kind prowls by day, and at evening repose; the owl by night, and keeps unseen in the day-time: but these birds, of the crane kind, seem at all hours employed; they are seldom at rest by day; and, during the whole night-season, every meadow and marsh resounds with their different calls, to courtship or to food.

This seems to be the time when they least fear interruption from man; and though they fly at all times, yet at this season, they appear more assiduously employed, both in providing for their present support, and continuing that of posterity. This is usually the season when the insidious fowler steals in upon their occupations, and fills the whole meadow with terror and destruction.

As all of this kind live entirely in waters, and among watery places, they seem provided by nature with a warmth of constitution to fit them for that cold element. They reside, by choice, in the coldest climates: and as other birds migrate here in our summer, their migrations hither are mostly in the winter. Even those that reside among us the whole season, retire in summer to the tops of our bleakest mountains; where they breed, and bring down their young, when the cold weather sets in.

Most of them, however, migrate, and retire to the polar regions; as those that remain behind in the mountains, and keep with us during summer, bear no proportion to the quantity which in winter haunt our marshes and low grounds. The snipe sometimes builds here; and the nest of the curlew is sometimes found in the plashes of our hills; but the number of these is very small; and it is most probable that they are only some stragglers who, not having strength or courage sufficient for the general voyage, take up from necessity their habitation here.

In general, during the summer, this whole class either choose the coldest countries to retire to, or the coldest and the moister part of ours to breed in. The curlew, the woodcock, the snipe, the godwit, the gray plover, the green and the long-legged plover, the knot, and the turnstone, are rather the guests than the natives

of this island. They visit us in the beginning of winter, and forsake us in the spring. They then retire to the mountains of Sweden, Poland, Prussia, and Lapland, to breed. Our country, during the summer season, becomes uninhabitable to them. The ground parched up by the heat; the springs dried away; and the vermicular insects already upon the wing; they have no means of subsisting. Their weak and delicately pointed bills are unfit to dig into a resisting soil; and their prey is departed, though they were able to reach its retreats. Thus, that season when nature is said to teem with life, and to put on her gayest liveries, is to them an interval of sterility and famine. The coldest mountains of the north are then a preferable habitation; the marshes there are never totally dried up; and the insects are in such abundance, that both above ground and underneath, the country swarms with them. In such retreats, therefore, these birds would continue always; but that the frosts, when they set in, have the same effect upon the face of the landscape, as the heats of summer. Every brook is stiffened into ice; all the earth is congealed into one solid mass; and the birds are obliged to forsake a region where they can no longer find subsistence.

Such are our visitants. With regard to those which keep with us continually, and breed here, they are neither so delicate in their food, nor perhaps so warm in their constitutions. The lapwing, the ruff, the redshank, the sandpiper, the sea-pie, the Norfolk plover, and the sea-lark, breed in this country, and for the most part reside here. In summer they frequent such marshes as are not dried up in any part of the year; the Essex hundreds, and the fens of Lincolnshire. There, in solitudes formed by surrounding marshes, they breed and bring up their young. In winter they come down from their retreats rendered uninhabitable by the flooding of the waters, and seek their food about our ditches and marshy meadow-grounds. Yet, even of this class, all are wanderers upon some occasions; and take wing to the northern climates, to breed and find subsistence. This happens when our summers are peculiarly dry; and when the fenny countries are not sufficiently watered to defend their retreats.

But though this be the usual course of nature, with respect to these birds, they often break through the general habits of their kind; and as the lapwing, the ruff, and the sandpiper, are some-

times seen to alter their manners, and to migrate from hence, instead of continuing to breed here; so we often find the woodcock, the snipe, and the curlew, reside with us during the whole season, and breed their young in different parts of the country. In Casewood, about two miles from Tunbridge, as Mr Pennant assures us, some woodcocks are seen to breed annually. The young have been shot there in the beginning of August; and were as healthy and vigorous as they are with us in winter, though not so well tasted. On the Alps, and other high mountains, says Willoughby, the woodcock continues all summer; I myself have flushed them on the top of Mount Jura, in June and July. The eggs are long, of a pale red colour, and stained with deeper spots and clouds. The nests of the curlew and the snipe are frequently found; and some of these perhaps never entirely leave this island.

It is thus that the same habits are, in some measure, common to all; but in nestling, and bringing up their young, one method takes place universally. As they all run and feed upon the ground, so they are all found to nestle there. The number of eggs generally to be seen in every nest, is from two to four; never under, and very seldom exceeding. The nest is made without any art; but the eggs are either laid in some little depression of the earth, or on a few bents and long grass, that scarcely preserve them from the moisture below. Yet such is the heat of the body of these birds, that the time of incubation is shorter than with any other of the same size. The magpie, for instance, takes twenty-one days to hatch its young; the lapwing takes but fourteen. Whether the animal oil, with which these birds abound, gives them this superior warmth, I cannot tell; but there is no doubt of their quick incubation.

In their seasons of courtship, they pair as other birds; but not without violent contests between the males, for the choice of the female. The lapwing and the plover are often seen to fight among themselves; but there is one little bird of this tribe, called the *ruff*, that has got the epithet of the *fighter*, merely from its great perseverance and animosity on these occasions. In the beginning of spring, when these birds arrive among our marshes, they are observed to engage with desperate fury against each other: it is then that the fowlers, seeing them intent on mutual destruction, spread their nets over them, and take them in great

numbers. Yet even in captivity their animosity still continues : the people that fat them up for sale, are obliged to shut them up in close dark rooms ; for if they let ever so little light in among them, the turbulent prisoners instantly fall to fighting with each other, and never cease till each has killed its antagonist, especially, says Willoughby, if any body stands by. A similar animosity, though in a less degree, prompts all this tribe ; but when they have paired, and begun to lay, their contentions are then over.

The place these birds chiefly choose to breed in, is in some island surrounded with sedgy moors, where men seldom resort ; and in such situations I have often seen the ground so strewn with eggs and nests, that one could scarcely take a step, without treading upon some of them. As soon as a stranger intrudes upon these retreats, the whole colony is up, and a hundred different screams are heard from every quarter. The arts of the lapwing, to allure men or dogs from her nest, are perfectly amusing. When she perceives the enemy approaching, she never waits till they arrive at her nest, but boldly runs to meet them : when she has come as near them as she dares to venture, she then rises with a loud screaming before them, seeming as if she were just flushed from hatching ; while she is then probably a hundred yards from the nest. Thus she flies with great clamour and anxiety, whining and screaming around the invaders, striking at them with her wings, and fluttering as if she were wounded. To add to the deceit, she appears still more clamorous, as more remote from the nest. If she sees them very near, she then seems to be quite unconcerned, and her cries cease, while her terrors are really augmenting. If there be dogs, she flies heavily at a little distance before them, as if maimed ; still vociferous and still bold, but never offering to move towards the quarter where her treasure is deposited. The dog pursues, in hopes every moment of seizing the parent, and by this means actually loses the young ; for the cunning bird, when she has thus drawn him off to a proper distance, then puts forth her powers, and leaves her astonished pursuers to gaze at the rapidity of her flight. The eggs of all these birds are highly valued by the luxurious ; they are boiled hard, and thus served up without any further preparation.

As the young of this class are soon hatched, so, when exclud-

ed, they quickly arrive at maturity. They run about after the mother as soon as they leave the egg; and being covered with a thick down, want very little of that clutching which all birds of the poultry kind, that follow the mother, indispensably require. They come to their adult state long before winter; and then flock together till the breeding season returns, which for a while dissolves their society.

As the flesh of almost all these birds is in high estimation, so many methods have been contrived for taking them. That used in taking the ruff, seems to be most advantageous; and it may not be amiss to describe it. The Ruff, which is the name of the male, the Reeve that of the female, is taken in nets about forty yards long, and seven or eight feet high. These birds are chiefly found in Lincolnshire and the Isle of Ely, where they come about the latter end of April, and disappear about Michaelmas. The male of this bird, which is known from all others of the kind by the great length of the feathers round his neck, is yet so various in his plumage, that it is said, no two ruffs were ever seen totally of the same colour. The nets in which these are taken, are supported by sticks, at an angle of near forty-five degrees, and placed either on dry ground, or in very shallow water, not remote from reeds: among these the fowler conceals himself, till the birds, enticed by a stale or stuffed bird, come under the nets; he then, by pulling a string, lets them fall, and they are taken; as are god-wits, knots, and gray-plover, also, in the same manner. When these birds are brought from under the net, they are not killed immediately, but fattened for the table, with bread and milk, hemp-seed and sometimes boiled wheat; but if expedition be wanted, sugar is added, which will make them a lump of fat in a fortnight's time. They are kept, as observed before, in a dark room; and judgment is required in taking the proper time for killing them, when they are at the highest pitch of fatness: for if that is neglected, the birds are apt to fall away. They are reckoned a very great delicacy; they sell for two shillings, or half-a-crown, a-piece; and are served up to the table with the train, like woodcocks, where we will leave them.

CHAP. XI.

OF THE WATER-HEN, AND THE COOT.*

BEFORE we enter upon water-fowls, properly so called, two or three birds claim our attention, which seem to form the shade between the web-footed tribe and those of the crane kind. These partake rather of the form than the habits of the crane; and though furnished with long legs and necks, rather swim than wade. They cannot properly be called web-footed; nor yet are they entirely destitute of membranes, which fringe their toes on each side, and adapt them for swimming. The birds in question are, the Water-Hen and the Bald-Coot.

These birds have too near an affinity, not to be ranked in the same description. They are shaped entirely alike, their legs are long, and their thighs partly bare; their necks are proportionable, their wings short, their bills short and weak, their colour black,

* As bearing some affinity to this genus of birds, we may here notice the *Rails*, so called from the rattling sound of their cry. These birds, which remain during the day concealed in the grass, seek their food morning and evening in the reeds and plants of marshes and meadows. They fly very far, and walk with great agility. They never join in families or flocks. They raise their neck like hens when they are disturbed, and the young quit the nest immediately after birth, and seize of their own accord the food which is indicated to them by the mother. To the *Land-rail* or *Corn-crake*, these remarks are not perhaps applicable in all respects.

The *Water-rail* runs along stagnant waters as fast as the corn-crake does over the fields. Sometimes, instead of traversing the water by swimming, it sustains itself on the broad leaves of aquatic plants. Its food consists in insects, snails, and shrimps. It makes its nest in the midst of plants, by the side of ponds and streams, and the female lays from six to ten yellowish eggs, marked with spots of reddish-brown. The flesh of this bird has a marshy taste, but is, notwithstanding, in some estimation.

The *Land-rail*, or *Corn-crake*, is in the genus *Gallinule* of Latham. In the more southern countries this is a bird of passage. It arrives among us and in France about April or May, and disappears in the commencement of October. By its short and sharp cry, *crik, crik*, we recognize its return. On approaching the quarter whence this cry proceeds, the sound is not discontinued, but heard a little farther on, which is occasioned by the bird, which can fly away but with difficulty, running with extreme swiftness through the tufted grass. In consequence of the coincidence between the return and departure of the quails and this bird, the latter has been sometimes deemed the conductor of the former. These birds are insectivorous when young, but the adult add grains, &c. of various kinds to this aliment.

their foreheads bald and without feathers, and their habits entirely the same. These, however, naturalists have thought proper to range in different classes, from very slight distinctions in their figure. The water-hen weighs but fifteen ounces ; the coot twenty-four. The bald part of the forehead in the coot is black ; in the water-hen it is of a beautiful pink colour. The toes of the water-hen are edged with a straight membrane ; those of the coot have it scolloped and broader.

The differences in the figure are but slight ; and those in their manner of living still less. The history of the one will serve for both. As birds of the crane kind are furnished with long wings, and easily change place, the water-hen, whose wings are short, is obliged to reside entirely near those places where her food lies : she cannot take those long journeys that most of the crane kind are seen to perform ; compelled by her natural imperfections, as well perhaps as by inclination, she never leaves the side of the pond or the river in which she seeks for provision. Where the stream is selvaged with sedges, or the pond edged with shrubby trees, the water-hen is generally a resident there : she seeks her food along the grassy banks, and often along the surface of the water. With Shakspeare's Edgar, she drinks the green mantle of the standing pool ; or, at least seems to prefer those places where it is seen. Whether she makes pond-weed her food, or hunts among it for water-insects, which are found there in great abundance, is not certain. I have seen them when pond-weed was taken out of their stomach. She builds her nest upon low trees and shrubs, of sticks and fibres, by the water-side. Her eggs are sharp at one end, white, with a tincture of green, spotted with red. She lays twice or thrice in a summer ; her young ones swim the moment they leave the egg, pursue their parent, and imitate all her manners. She rears, in this manner, two or three broods in a season : and when the young are grown up, she drives them off to shift for themselves.

As the coot is a larger bird, it is always seen in larger streams, and more remote from mankind. The water-hen seems to prefer inhabited situations : she keeps near ponds, moats, and pools of water near gentlemen's houses ; but the coot keeps in rivers, and among rushy margined lakes. It there makes a nest of such weeds as the stream supplies, and lays them among the reeds, floating on the surface, and rising and falling with the water.

The reeds among which it is built keep it fast ; so that it is seldom washed into the middle of the stream. But if this happens, which is sometimes the case, the bird sits in her nest, like a mariner in his boat, and steers with her legs her cargo into the nearest harbour : there, having attained her port, she continues to sit in great tranquillity, regardless of the impetuosity of the current ; and though the water penetrates her nest, she hatches her eggs in that wet condition.

The water-hen never wanders ; but the coot sometimes swims down the current, till it even reaches the sea. In this voyage these birds encounter a thousand dangers : as they cannot fly far, they are hunted by dogs and men ; as they never leave the stream, they are attacked and destroyed by otters ; they are preyed upon by kites and falcons ; and they are taken in still greater numbers in weirs made for catching fish ; for these birds are led into the nets, while pursuing small fish and insects, which are their principal food. Thus animated nature affords a picture of universal invasion ! Man destroys the otter, the otter destroys the coot, the coot feeds upon fish, and fish are universally the tyrants of each other !

To these birds, with long legs and finny toes, I will add one species more, with short legs and finny toes ; I mean the Grebe. The entire resemblance of this bird's appetites and manners to those of the web-footed class, might justly induce me to rank it among them ; but as it resembles those above described, in the peculiar form of its toes, and bears some similitude in its manners also, I will for once sacrifice method to brevity. The grebe is much larger than either of the former, and its plumage white and black ; it differs also entirely in the shortness of its legs, which are made for swimming, and not walking : in fact, they are from the knee upward hid in the belly of the bird, and have consequently very little motion. By this mark, and by the scolloped fringe of the toes, may this bird be easily distinguished from all others.

As they are thus, from the shortness of their wings, ill formed for flying, and from the uncommon shortness of their legs utterly unfitted for walking, they seldom leave the water, and chiefly frequent those broad shallow pools where their faculty of swimming can be turned to the greatest advantage, in fishing and seeking their prey.

They are chiefly, in this country, seen to frequent the meres of Shropshire and Cheshire ; where they breed among reeds and flags, in a floating nest, kept steady by the weeds of the margin. The female is said to be a careful nurse of her young, being observed to feed them most assiduously with small eels ; and when the little brood is tired, the mother will carry them either on her back or under her wings. This bird preys upon fish, and is almost perpetually diving. It does not show much more than the head above water ; and is very difficult to be shot, as it darts down on the appearance of the least danger. It is never seen on land ; and, though disturbed ever so often, will not leave that lake, where alone, by diving and swimming, it can find food and security. It is chiefly sought for the skin of its breast, the plumage of which is of a most beautiful silvery white, and as glossy as satin. This part is made into tippets ; but the skins are out of season about February, losing their bright colour ; and in breeding-time their breasts are entirely bare.

BOOK VII.

OF WATER-FOWL.

CHAP. I.

WATER-FOWL IN GENERAL.

IN settling the distinctions among the other classes of birds, there was some difficulty; one tribe encroached so nearly upon the nature and habitudes of another, that it was not easy to draw the line which kept them asunder: but in water-fowl, nature has marked them for us by a variety of indelible characters; so that it would be almost as unlikely to mistake a land-fowl for one adapted for living and swimming among the waters, as a fish for a bird.

The first great distinction in this class appears in the toes, which are webbed together for swimming. Those who have remarked the feet or toes of a duck, will easily conceive how admirably they are formed for making way in the water. When men swim, they do not open the fingers, so as to let the fluid pass through them; but closing them together, present one broad surface to beat back the water, and thus push their bodies along. What man performs by art, nature has supplied to water-fowl; and, by broad skins, has webbed their toes together, so that they expand two broad oars to the water; and thus, moving them alternately, with the greatest ease paddle along. We must observe also, that the toes are so contrived, that as they strike backward, their broadest hollow surface beats the water; but as they gather them in again, for a second blow, their front surface contracts, and does not impede the bird's progressive motion.

As their toes are webbed in the most convenient manner, so are their legs also made most fitly for swift progression in the

water. The legs of all are short, except the three birds described in a former chapter ; namely, the flamingo, the avosetta, and the corrira : all which, for that reason, I have thought proper to rank among the crane kind, as they make little use of their toes in swimming. Except these, all web-footed birds have very short legs ; and these strike, while they swim, with great facility — Were the leg long, it would act like a lever whose prop is placed to a disadvantage ; its motions would be slow, and the labour of moving it considerable. For this reason, the very few birds whose webbed feet are long, never make use of them in swimming : the web at the bottom seems only of service as a broad base, to prevent them from sinking while they walk in the mud ; but it otherwise rather retards than advances their motion.

The shortness of their legs in the web-footed kinds, renders them as unfit for walking on land, as it qualifies them for swimming in their natural element. Their stay, therefore, upon land, is but short and transitory ; and they seldom venture to breed far from the sides of those waters where they usually remain. In their breeding seasons, their young are brought up by the water-side ; and they are covered with a warm down, to fit them for the coldness of their situation. The old ones, also, have a closer, warmer plumage, than birds of any other class. It is of their feathers that our beds are composed ; as they neither mat, nor imbibe humidity, but are furnished with an animal-oil that glazes their surface, and keeps each other separate. In some, however, this animal-oil is in too great abundance, and is as offensive from its smell, as it is serviceable for the purposes of household economy. The feathers, therefore, of all the penguin kind are totally useless for domestic purposes ; as neither boiling nor bleaching can divest them of their oily rancidity. Indeed, the rancidity of all new feathers, of whatever water-fowl they be, is so disgusting, that our Upholsterers give near double the price for old feathers that they afford for new : to be free from smell, they must all be lain upon for some time ; and their usual method is to mix the new and the old together.

This quantity of oil, with which most water-fowl are supplied, contributes also to their warmth in the moist element where they reside. Their skin is generally lined with fat ; so that, with the warmth of the feathers externally, and this natural lining more

internally, they are better defended against the changes or the inclemencies of the weather, than any other class whatever.

As, among land-birds, there are some found fitted entirely for depredation, and others for a harmless method of subsisting upon vegetables, so also, among these birds, there are tribes of plunderers that prey, not only upon fish, but sometimes upon water-fowl themselves. There are likewise more inoffensive tribes, that live upon insects and vegetables only. Some water-fowls subsist by making sudden stoops from above, to seize whatever fish come near the surface; others again, not furnished with wings long enough to fit them for flight, take their prey by diving after it to the bottom.

From hence all water-fowl naturally fall into three distinctions. Those of the Gull kind, that, with long legs and round bills, fly along the surface to seize their prey: those of the Penguin kind, that, with round bills, legs hid in the abdomen, and short wings, dive after their prey: and, thirdly, those of the Goose kind, with flat broad bills, that lead harmless lives, and chiefly subsist upon insects and vegetables.

These are not speculative distinctions, made up for the arrangement of a system; but they are strongly and evidently marked by nature. The gull kind are active and rapacious; constantly, except when they breed, keeping upon the wing; fitted for a life of rapine, with sharp straight bills for piercing, or hooked at the end for holding their fishy prey. In this class we may rank the Albatross, the Cormorant, the Gannet or Solland Goose, the Shag, the Frigate-bird, the Great Brown Gull, and all the lesser tribe of gulls and sea-swallows.

The Penguin kind, with appetites as voracious, bills as sharp, and equally eager for prey, are yet unqualified to obtain it by flight. Their wings are short, and their bodies large and heavy, so that they can neither run nor fly. But they are formed for diving in a very peculiar manner. Their feet are placed so far backward, and their legs so hid in the abdomen, that the slightest stroke sends them head foremost to the bottom of the water. To this class we may refer the Penguin, the Auk, the Skout, the Sea-turtle, the Bottlenose, and the Loon.

The Goose kind are easily distinguishable, by their flat broad bills covered with a skin, and their manner of feeding, which is mostly upon vegetables. In this class we may place the Swan,

the Goose, the Duck, the Teal, the Widgeon, and all their numerous varieties.

In describing the birds of these three classes, I will put the most remarkable of each class at the beginning of their respective tribes, and give their separate history; then, after having described the chiefs of the tribe, the more ordinary sorts will naturally fall in a body, and come under a general description, behind their leaders. But before I offer to pursue this methodical arrangement, I must give the history of a bird, that from the singularity of its conformation, seems allied to no species; and should, therefore, be separately described—I mean the Pelican

CHAP. II.

THE PELICAN.*

THE Pelican of Africa is much larger in the body than a swan, and somewhat of the same shape and colour. Its four

* The pelican affords an excellent illustration of the fifth and last Order of Birds, the Swimmers; the essential character of which consists in the membranous union of the toes, which renders them what is usually termed web-footed, and enables them to propel themselves upon the surface of the water with greater or less rapidity in proportion to the greater or less comparative extent of the membrane in which their toes are enveloped. They are all consequently inhabitants of marshy situations, of the banks of rivers and lakes, or of the seacoast; and most of them seek their subsistence in their most congenial element, the water, notwithstanding that by far the greater number of them are also endowed with very considerable powers of flight.

Linnæus united under the common title of Pelicans, the Cormorants, the Boobies, and several other birds, which differ from the typical species of the genus by many important characters, the chief point of agreement between them consisting in the form and extent of the membrane which unites the toes. The Linnæan group has subsequently been raised to the rank of a family, and its component parts form several distinct genera, that which comprehends the true Pelicans, the genus *Onocrotalus* of Brisson, being characterised as follows. Their bill is of very great length, straight, broad, flattened above, and terminated by a slight hook; the lower mandible consists of two lateral branches, united at the point, and having interposed between them a membranous pouch capable of very great dilatation; their four toes are all enveloped to the very apex in the common membrane; their legs are short, strong, and maintain the body in a state of equilibrium, their lower part being entirely destitute of feathers.

toes are all webbed together ; and its neck, in some measure, resembles that of a swan : but that singularity in which it differs from all other birds, is in the bill and the great pouch underneath, which are wonderful and demand a distinct description. This enormous bill is fifteen inches from the point to the opening of the mouth, which is a good way back behind the eyes. At the base, the bill is somewhat greenish, but varies towards the end, being of a reddish-blue. It is very thick in the beginning, but tapers off to the end, where it hooks downwards. The upper chap is still more extraordinary ; for to the lower edges of it hangs a bag, reaching the whole length of the bill to the neck, which is said to be capable of containing fifteen quarts of water. This bag the bird has a power of wrinkling up into the hollow of the under-chap : but by opening the bill, and putting one's hand down into the bag, it may be distended at pleasure. The skin of which it is formed will then be seen of a bluish ash-colour, with many fibres and veins running over its surface. It is not covered with feathers, but a short downy substance, as smooth and as soft as satin, and is attached all along the under edges of the chap, to be fixed backward to the neck of the bird by proper ligaments, and reaches near half way down. When this bag is empty it is not seen ; but when the bird has fished with success, it

The Pelican is one of the largest water-birds, considerably exceeding the size of the swan, and frequently measuring from five to six feet between the extremity of the bill and that of the tail, and from ten to twelve between the tips of the expanded wings. Its bill is nearly a foot and a half in length, and from an inch and a half to two inches broad ; and its pouch is capable of containing, when stretched to its utmost extent, two or three gallons of water. The quantity of fish which it sometimes accumulates in the same serviceable repository is spoken of as enormous. Notwithstanding their great bulk and apparent clumsiness, the large extent of their wings, and the extreme lightness of their bones, which are so thin as to be almost transparent, enable these birds to rise to a lofty pitch in the air, to hover at a moderate elevation, or to skim rapidly along the surface of the water with as much facility as they dive into its depths in pursuit of their prey. They sometimes assemble in large numbers, and in this case are said by Buffon to act in concert, and to show no little skill in manœuvring with the view of securing a plentiful quarry, forming themselves into a circular line, and gradually narrowing the extent of the space enclosed, until they have driven the fishes into so small a compass as to render them a certain prey ; when at a given signal they all at once plunge into the water and seize upon their terrified victims, filling their pouches with the spoil, and flying to the land, there to devour it at their leisure. This fishery is carried on both at sea and in fresh water.

is then incredible to what an extent it is often seen dilated. For the first thing the pelican does in fishing is to fill up the bag; and then it returns to digest its burden at leisure. When the bill is open to its widest extent, a person may run his head into the bird's mouth, and conceal it in this monstrous pouch, thus adapted for very singular purposes. Yet this is nothing to what Ruysch assures us, who avers, that a man has been seen to hide his whole leg, boot and all, in the monstrous jaws of one of these animals. At first appearance this would seem impossible, as the sides of the under chap, from which the bag depends, are not above an inch asunder when the bird's bill is first opened; but then they are capable of great separation; and it must necessarily be so, as the bird preys upon the largest fishes, and hides them by dozens in its pouch. Tertre affirms, that it will hide as many fish as will serve sixty hungry men for a meal.

Such is the formation of this extraordinary bird, which is a native of Africa and America. The pelican was once also known in Europe, particularly in Russia; but it seems to have deserted our coasts. This is the bird of which so many fabulous accounts have been propagated; such as its feeding its young with its own blood, and its carrying a provision of water for them in its great reservoir in the desert. But the absurdity of the first account answers itself; and as for the latter, the pelican uses its bag for very different purposes than that of filling it with water.

Its amazing pouch may be considered as analogous to the crop in other birds, with this difference, that as theirs lies at the bottom of the gullet, so this is placed at the top.—Thus, as pigeons and other birds macerate their food for their young in their crops, and then supply them, so the pelican supplies its young by a more ready contrivance, and macerates their food in its bill, or stores it for its own particular sustenance.

The ancients were particularly fond of giving this bird admirable qualities and parental affections; struck, perhaps, with its extraordinary figure, they were willing to supply it with as extraordinary appetites; and having found it with a large reservoir, they were pleased with turning it to the most tender and parental uses. But the truth is, the pelican is a very heavy, sluggish, voracious bird, and very ill fitted to take those flights, or to make those cautious provisions for a distant time, which we have been told

they do. Father Labat, who seems to have studied their manners with great exactness, has given us a minute history of this bird, as found in America ; and from him I will borrow mine.

The pelican, says Labat, has strong wings, furnished with thick plumage of an ash-colour, as are the rest of the feathers over the whole body. Its eyes are very small when compared to the size of its head ; there is a sadness in its countenance, and its whole air is melancholy. It is as dull and reluctant in its motions, as the flamingo is sprightly and active. It is slow of flight ; and when it rises to fly, performs it with difficulty and labour. Nothing, as it would seem, but the spur of necessity could make these birds change their situation, or induce them to ascend into the air ; but they must either starve or fly.

They are torpid and inactive to the last degree, so that nothing can exceed their indolence but their gluttony ; it is only from the stimulations of hunger that they are excited to labour ; for otherwise they would continue always in fixed repose. When they have raised themselves about thirty or forty feet above the surface of the sea, they turn their head with one eye downwards, and continue to fly in that posture. As soon as they perceive a fish sufficiently near the surface, they dart down upon it with the swiftness of an arrow, seize it with unerring certainty, and store it up in their pouch. They then rise again, though not without great labour, and continue hovering and fishing, with their head on one side as before.

This work they continue with great effort and industry till their bag is full, and then they fly to land to devour and digest at leisure the fruits of their industry. This, however, it would appear, they are not long in performing ; for towards night they have another hungry call, and they again reluctantly go to labour. At night, when their fishing is over, and the toil of the day crowned with success, these lazy birds retire a little way from the shore ; and, though with the webbed feet and clumsy figure of a goose, they will be contented to perch no where but upon trees, among the light and airy tenants of the forest. There they take their repose for the night ; and often spend a great part of the day, except such times as they are fishing, sitting in dismal solemnity, and, as it would seem, half asleep. Their attitude is, with the head resting upon their great bag, and that resting upon their breast. There they remain without motion, or once chang

ing their situation, till the calls of hunger break their repose, and till they find it indispensably necessary to fill their magazine for a fresh meal. Thus their life is spent between sleeping and eating; and our author adds, that they are as foul as they are voracious, as they are every moment voiding excrements in heaps as large as one's fist.

The same indolent habits seem to attend them even in preparing for incubation, and defending their young when excluded. The female makes no preparation for her nest, nor seems to choose any place in preference to lay in; but drops her eggs on the bare ground to the number of five or six, and there continues to hatch them. Attached to the place, without any desire of defending her eggs or her young, she tamely sits, and suffers them to be taken from under her. Now and then she just ventures to peek, or to cry out when a person offers to beat her off.

She feeds her young with fish macerated for some time in her bag; and when they cry, flies off for a new supply. Labat tells us, that he took two of these when very young, and tied them by the leg to a post stuck into the ground, where he had the pleasure of seeing the old one for several days come to feed them, remaining with them the greatest part of the day, and spending the night on the branch of a tree that hung over them. By these means they were all three become so familiar, that they suffered themselves to be handled; and the young ones very kindly accepted whatever fish he offered them. These they always put first into their bag, and then swallowed at their leisure.

It seems, however, that they are but disagreeable and useless domestics; their gluttony can scarcely be satisfied; their flesh smells very rancid; and tastes a thousand times worse than it smells. The native Americans kill vast numbers; not to eat, for they are not fit even for the banquet of a savage; but to convert their large bags into purses and tobacco pouches. They bestow no small pains in dressing the skin with salt and ashes, rubbing it well with oil, and then forming it to their purpose. It thus becomes so soft and pliant, that the Spanish women sometimes adorn it with gold and embroidery to make work-bags of.

Yet with all the seeming habitudes of this bird, it is not entirely incapable of instruction in a domestic state. Father Raymond assures us, that he has seen one so tame and well edu-

cated among the native Americans, that it would go off in the morning at the word of command, and return before night to its master, with its great pouch distended with plunder; a part of which the savages would make it disgorge, and a part they would permit it to reserve for itself.

“The Pelican,” as Faber relates, “is not destitute of other qualifications. One of these which was brought alive to the duke of Bavaria’s court, where it lived forty years, seemed to be possessed of very uncommon sensations. It was much delighted in the company and conversation of men, and in music both vocal and instrumental: for it would willingly stand,” says he, “by those that sung, or sounded the trumpet; and stretching out its head, and turning its ear to the music, listened very attentively to its harmony; though its own voice was little pleasanter than the braying of an ass.” Gesner tells us, that the emperor Maximilian had a tame pelican, which lived for above eighty years, and that always attended his army on their march. It was one of the largest of the kind, and had a daily allowance by the emperor’s orders. As another proof of the great age to which the pelican lives, Aldrovandus makes mention of one of these birds that was kept several years at Mechlin, was verily believed to be fifty years old.—We often see these birds at our shows about town.

CHAP. III.

OF THE ALBATROSS, THE FIRST OF THE GULL KIND.

THOUGH this is one of the largest and most formidable birds of Africa and America, yet we have but few accounts to enlighten us in its history. The figure of the bird is thus described by Edwards: “The body is rather larger than that of a pelican; and its wings, when extended, ten feet from tip to tip. The bill, which is six inches long, is yellowish, and terminates in a crooked point. The top of the head is of a bright brown; the back is of a dirty deep spotted brown; and the belly and under the wings is white; the toes, which are webbed, are of a flesh colour.”

Such are the principal traits in this bird's figure : but these lead us a very short way in its history ; and our naturalists have thought fit to say nothing more. However, I am apt to believe this bird to be the same with that described by Wicquefort, under the title of the Alcatraz ; its size, its colours, and its prey, incline me to think so. He describes it as a kind of great gull, as large in the body as a goose, of a brown colour, with a long bill, and living upon fish, of which they kill great numbers.

This bird is an inhabitant of the tropical climates, and also beyond them as far as the Straits of Magellan in the South Seas. It is one of the most fierce and formidable of the aquatic tribe, not only living upon fish, but also such small water-fowl as it can take by surprise. It preys, as all the gull kind do, upon the wing ; and chiefly pursues the flying-fish, that are forced from the sea by the dolphins. The ocean in that part of the world presents a very different appearance from the seas with which we are surrounded. In our seas we see nothing but a dreary expanse, ruffled by winds, and seeming forsaken by every class of animated nature. But the tropical seas, and the distant southern latitudes beyond them, are all alive with birds and fishes, pursuing and pursued. Every various species of the gull-kind are there seen hovering on the wing, at a thousand miles distance from the shore. The flying fish are every moment rising to escape from their pursuers of the deep, only to encounter equal dangers in the air. Just as they rise the dolphin is seen to dart after them, but generally in vain ; the gull has more frequent success, and often takes them at their rise ; while the albatross pursues the gull, and obliges it to relinquish its prey ; so that the whole horizon presents but one living picture of rapacity and evasion.

So much is certain ; but how far we are to credit Wicquefort, in what he adds concerning this bird, the reader is left to determine. " As these birds, except when they breed, live entirely remote from land, so they are often seen, as it should seem, sleeping in the air. At night, when they are pressed by slumber, they rise into the clouds as high as they can ; there, putting their head under one wing, they beat the air with the other, and seem to take their ease. After a time, however, the weight of their bodies, only thus half supported, brings them down ; and they are seen descending, with a pretty rapid motion, to the sur-

face of the sea. Upon this they again put forth their efforts to rise ; and thus alternately ascend and descend at their ease. But it sometimes happens," says my author, " that in these slumbering flights, they are off their guard, and fall upon deck, where they are taken."

What truth there may be in this account I will not take upon me to determine : but certain it is, that few birds float upon the air with more ease than the albatross, or support themselves a longer time in that element. They seem never to feel the accesses of fatigue ; but night and day upon the wing, are always prowling, yet always emaciated and hungry.

But though this bird be one of the most formidable tyrants of the deep, there are some associations which even tyrants themselves form, to which they are induced either by caprice or necessity. The albatross seems to have a peculiar affection for the penguin, and a pleasure in its society. They are always seen to choose the same places for breeding ; some distant uninhabited island, where the ground slants to the sea, as the penguin is not formed either for flying or climbing. In such places their nests are seen together, as if they stood in need of mutual assistance and protection. Captain Hunt, who for some time commanded at our settlement upon Falkland Islands, assures me, that he was often amazed at the union preserved between these birds, and the regularity with which they built together. In that bleak and desolate spot, where the birds had long continued undisturbed possessors, and no way dreaded the encroachment of men, they seemed to make their abode as comfortable as they expected it to be lasting. They were seen to build with an amazing degree of uniformity ; their nests covering fields by thousands, and resembling a regular plantation. In the middle, or high, the albatross raised its nest, on heath, sticks, and long grass, about two feet above the surface : round this the penguins made their lower settlements, rather in holes in the ground, and most usually eight penguins to one albatross. Nothing is a stronger proof of Mr Buffon's fine observation, that the presence of man not only destroys the society of meaner animals, but their instincts also. These nests are now, I am told, totally destroyed ; the society is broke up ; and the albatross and penguin have gone to breed upon more desert shores, in greater security.*

* The Albatross, is also called the man-of-war bird. In the West Indies

CHAP. V.

THE CORMORANT.

THE Cormorant is about the size of a large Muscovy duck, and may be distinguished from all other birds of this kind, by its four toes being united by membranes together; and by the middle toe being toothed or notched like a saw, to assist it in holding its fishy prey. The head and neck of this bird are of a sooty blackness; and the body thick and heavy, more inclined in figure to that of the goose than the gull. The bill is straight, till near the end, where the upper chap bends into a hook.

But notwithstanding the seeming heaviness of its make, there are few birds more powerfully predaceous. As soon as the winter approaches, they are seen dispersed along the sea-shore, and ascending up the mouths of fresh-water rivers, carrying destruction to all the finny tribe. They are most remarkably voracious, and have a most sudden digestion. Their appetite is for ever craving, and never satisfied. This gnawing sensation may probably be increased by the great quantity of small worms that fill their intestines, and which their unceasing gluttony contributes to engender.

Thus formed with the grossest appetites, this unclean bird has the most rank and disagreeable smell, and is more fetid than even carrion, when in its most healthful state. Its form,

these birds are said to foretell the arrival of ships; which is frequently true, and may arise from a very natural cause. They always fish in fine weather; so that, when the wind is rough at sea, they retire into the harbours, where they are protected by the land; and the same wind that blows them in, brings likewise whatever vessels may be exposed to its fury, to seek a retreat from it. They devour fish with great gluttony and are often so gorged as to be unable to fly. Their cry resembles the braying of an ass.

The Chocolate Albatross.—This bird inhabits the Pacific Ocean, and is three feet long. The bill is whitish; the body of a deep chestnut brown colour; belly pale; face and wings beneath whitish. The irides are brown; the legs bluish white, with white claws.

The Yellow-Nosed Albatross.—The colour is white; the bill is black; keel of the upper mandible, and base of the lower one, yellow; the body above is of a black-blue colour; beneath it is white. It inhabits the Pacific Ocean, and is about three feet long. The irides are brown; the nape of the neck and rump, white; the legs are pale yellow; the fore-part and connecting membrane dusky.

says an ingenious modern, is disagreeable ; its voice is hoarse and croaking ; and all its qualities obscene. No wonder then that Milton should make Satan personate this bird, when he sent him upon the basest purposes, to survey with pain the beauties of Paradise, and to sit devising death on the tree of life.¹ It has been remarked, however, of our poet, that the making a water-fowl perch upon a tree, implied no great acquaintance with the history of nature. In vindication of Milton, Aristotle expressly says, that the cormorant is the only water-fowl that sits on trees. We have already seen the pelican of this number ; and the cormorant's toes seem as fit for perching upon trees as for swimming ; so that our epic bard seems to have been as deeply versed in natural history as in criticism.

Indeed this bird seems to be of a multiform nature ; and wherever fish are to be found, watches their migrations. It is seen as well by land as sea ; it fishes in fresh-water lakes, as well as in the depths of the ocean ; it builds in the cliffs of rocks, as well as on trees ; and preys not only in the-day-time, but by night.

Its indefatigable nature, and its great power in catching fish, were probably the motives that induced some nations to breed this bird up tame, for the purpose of fishing ; and Willoughby assures us, it was once used in England for that purpose. The description of their manner of fishing is thus delivered by Faber. " When they carry them out of the rooms where they are kept, to the fish-pools, they hoodwink them, that they may not be frightened by the way. When they are come to the rivers, they take off their hoods ; and having tied a leather thong round the lower part of their necks, that they may not swallow down the fish they catch, they throw them into the river. They presently dive under water, and there for a long time, with wonderful swiftness, pursue the fish ; and when they have caught them, rise to the top of the water, and pressing the fish lightly with their bills, swallow them ; till each bird hath, after this manner, devoured five or six fishes. Then their keepers call them to the fist, to which they readily fly ; and, one after another, vomit up all their fish, a little bruised with the first nip, given in catching them. When they have done fishing, setting their birds on some high place, they loose the string from their necks, leaving

¹ Vide Pennant's Zoology, p. 477.

the passage to the stomach free and open ; and, for their reward, they throw them part of their prey ; to each one or two fishes, which they will catch most dexterously, as they are falling in the air."*

* The Corvorants are found in all parts of the globe, and are equally good divers and swimmers. When they swim, they frequently have the head aloof out of the water ; and in diving, they pursue with the most astonishing swiftness the prey which they have perceived, and which seldom succeeds in escaping them. When they have taken it they return to the surface, and to swallow it the more easily, they throw it into the air, and receive the head, so that the fins may incline in the passage of the gullet, while the membranous skin inclines so as to let pass the entire body of the fish, which is often very large, in proportion to the neck of the bird. In many places, but more especially in China, corvorants have been employed in fishing, a ring being put on the lower part of the neck to prevent them from swallowing the fish, which they are taught to bring back to their master.

They usually inhabit the borders of the sea and the mouths of rivers, and feed on various kinds of fish. When their appetite is sated, they perch on trees like other birds of similar palmation. They have a double moulting.

The following account of the Chinese Corvorant by Sir George Staunton, is the most authentic of any that has yet been given to us. "The Embassy," he says, "had not proceeded far on the southern branch of the Imperial Canal, when they arrived in the vicinity of a place where the *Leu-tze*, or famed fishing-bird of China, is bred, and instructed in the art of supplying his owner with fish in great abundance. It is a species of the pelican, resembling the common corvorant ; but on a specimen being submitted to Dr Shaw, he has distinguished it in the following terms. Brown pelican, or corvorant, with white throat ; the body whitish beneath ; the tail rounded, the irides blue ; the bill yellow. On a large lake close to this part of the canal, and to the eastward of it, are thousands of small boats and rafts built entirely for this species of fishing. On each boat or raft are ten or a dozen birds, which at a signal from the owner, plunge into the water ; and it is astonishing to see the enormous size of the fish with which they return grasped within their bills. They appear to be so well trained, that it did not require either ring or cord about their throats to prevent them from swallowing any portion of their prey, except what their master was pleased to return to them for encouragement and food. The boat used by these fishermen is of a remarkably light make, and is often carried to the lake, together with the fishing birds, by the men who are there to be supported by it."

Corvorants are common on many of our sea-coasts, building their nest on the highest trees of the cliffs that hang over the sea ; and laying three or more pale green eggs, about the size of those of a goose. In winter they disperse along the shores, and visit the fresh waters, where they commit great depredations amongst the fish. They are remarkably voracious, having a most sudden digestion, promoted, perhaps, by the infinite quantity of small worms that fill their intestines. They are very wary, except when they have filled their stomach, when they become so stupid, that it is fre-

At present the cormorant is trained in every part of China for the same purpose, where there are many lakes and canals. "To this end," says Le Compte, "they are educated as men rear up spaniels or hawks, and one man can easily manage a hundred.

quently an easy matter to catch them in a net, or even by means of a noose thrown over their heads. We are informed by the Rev. Mr Bingly, that, in the year 1798, he saw one that had been seized by the hand, when perched at the top of a rock just behind the town of Caernarvon. And in the year 1793, one of them was observed sitting on the vane of St Martin's steeple, Ludgate Hill, London; and was shot there in the presence of a great number of people.

It is no uncommon thing to see twenty of these birds together on the rocks of the sea-coast, with extended wings, drying themselves in the wind. In this position they remain sometimes nearly an hour, without once closing the wings; and as soon as these are sufficiently dry to enable the feathers to imbibe the oil, they press this substance from the receptacle on their rumps, and dress the feathers with it. It is only in one particular state that the oily matter can be spread on them; when they are somewhat damp; and the instinct of the birds teaches them the proper moment.

The skins of the corvorants are very tough; and are used by the Greenlanders, when sewed together, and put into proper form for garments. And the skin of the jaws like that of others of this tribe, serves these people for bladders to buoy up their smaller kinds of fishing darts.

Shag, or Lesser Corvorant.—The common shag, which is another of the corvorant genus, is in length two feet six inches; and the extent of its wings eight feet. The general colour of its plumage is black; the belly is dusky; and the head and neck glossed with green.

The crested shag is somewhat less than the preceding, and is less common. There are two kinds which are natives of Kamtschatka; these are distinguished as the violet and the red-faced shags, being so ornamented with those colours. Besides there are several others found in New Zealand, and also in Africa; in the latter of which there are two species not larger than a teal. The whole of these like the corvorants build in trees.

The *Frigates* are birds of the corvorant genus, which inhabit the inter-tropical seas of both worlds. They chiefly pursue the flying fish, darting upon them with amazing rapidity. They also attack the booby bird, which they force to disgorge or drop its booty.

The *Booby* bird is to be met with in every sea, but particularly in South America and neighbouring isles. It is two feet and a half long; bill gray, and brownish at the base; the irides pale ash-colour; the skin is bald and yellowish; the body whitish beneath; the tail brownish at the tip, and wedged; the legs are yellowish: the primary quill feathers are tipped with black; the face is red. From the length of its wings and shortness of its legs, it experiences a difficulty in rising to flight, and hence is often taken with the hand. This circumstance has gained it its name, and created a doubt whether it possessed the common instinct of self-preservation.

The *Red-Backed Pelican*.—The colour is reddish; the head crested; and the neck is reddish white; the tail is of a dusky ash-colour; the gullet is pouched. It is an inhabitant of Africa, and is five feet long. The bill, and

The fisher carries them out into the lake, perched on the gunnel of his boat, where they continue tranquil, and expecting his orders with patience. When arrived at the proper place, at the first signal given each flies a different way to fulfil the task as-

naked area of the eyes, and pouch, are dirty yellow; the crest is four inches long; the body beneath is pale; the quill feathers are black; and the scapulars of a gray lead colour; the feathers of the breast are long and narrow; the legs are yellow. This bird, like others of its race, is very voracious.

The *Anhingas*, *Plotus*, or *Darter* of Latham, are birds which inhabit the most southern and the warmest regions of both continents, where they frequent fresh waters, and inundated savannahs. They perch on trees which border the shore, pass the night there, and construct their nest on the most elevated branches. They swim and dive after fish. If the fish which they catch is small, they swallow it entire, without leaving the water. If too large, they carry it on a rock, or the trunk of a tree, and divide it with the bill and feet. When the anhingas fly, the neck, stretched out, forms a horizontal line with the tail; but when they are at rest, its perpetual oscillation considerably augments its resemblance to a snake. Being extremely wild, these birds are but seldom seen on land; and when they swim, their head is almost the only part which is out of the water, into which they plunge altogether on the slightest appearance of danger, and do not reappear, but at considerable distances. Even then, they only show themselves for the time which is necessary for respiration. Such is their cunning, that they having dived at the distance of a hundred paces beyond the pursuer, they emerge to respire the air at more than a thousand paces behind him, until finding some reeds, they conceal themselves there, and appear no more. Their skin is very thick, and the flesh oily and ill-flavoured.

The *Plotus Anhinga*, according to Bartram, live in small societies, and assemble on the dry branches which hang over rivers. When surprised, they drop into the water, as if dead, and after one or two minutes, they reappear, at a great distance, showing nothing but the neck, and sometimes the end of the tail. During the heat of the day, they fly in great numbers, to a considerable elevation in the air, over lakes and rivers.

The *Phaeton*, or *Tropic Birds*, received from Linnaeus the former appellation, because, from their habitual residence under the burning zone, bounded by the tropics, they seem attached to the chariot of the sun. From this climate they remove but little, and are rarely seen beyond the 21st parallel of south latitude. Their appearance, accordingly, indicates to mariners their approaching passage under this zone, from whatever side they may arrive. Still they advance sea-ward, many hundreds of leagues. These birds have a mode of flying which is peculiar to themselves. They appear, from a sort of trembling, to be extenuated with fatigue, and on the point of falling. They drop down from a considerable height, abandoning themselves to their weight, and seize the fish without diving. But when they pursue the flying-fish, which constitute their principal aliment, they shave the surface of the water. When they perceive a vessel, they come to reconnoitre it, hovering above its head. They are particularly attracted by any thing red.

The tropic-birds, like the corvoraunts, perch on the highest trees; and it

signed it. It is very pleasant, on this occasion, to behold with what sagacity they portion out the lake or the canal where they are upon duty. They hunt about, they plunge, they rise a hundred times to the surface, until they have at last found their prey. They then seize it with their beak by the middle, and carry it without fail to their master. When the fish is too large, they then give each other mutual assistance: one seizes it by the head, the other by the tail, and in this manner carry it to the boat together. There the boatman stretches out one of his long oars, on which they perch, and being delivered of their burden, they fly off to pursue their sport. When they are wearied, he lets them rest for a while; but they are never fed till their work is over. In this manner, they supply a very plentiful table; but still their natural gluttony cannot be reclaimed even by education. They have always while they fish the same string fastened round their throats, to prevent them from devouring their prey, as otherwise they would at once satiate themselves, and discontinue their pursuit the moment they had filled their bellies."

As for the rest, the cormorant is the best fisher of all birds; and though fat and heavy with the quantity it devours, is nevertheless generally upon the wing. The great activity with which it pursues, and from a vast height drops down to dive after its prey, offers one of the most amusing spectacles to those who stand upon a cliff on the shore. This large bird is seldom seen in the air, but where there are fish below; but then they must be near the surface, before it will venture to souse upon them. If they are at a depth beyond what the impetus of its flight makes the cormorant capable of diving to, they certainly escape him; for this bird cannot move so fast under water, as the fish can swim. It seldom, however, makes an unsuccessful dip; and is often seen rising heavily, with a fish larger than it can readily devour. It sometimes also happens, that the cormorant has

is supposed that when they are at a very considerable distance from all land, they are enabled, by means of their completely palmated feet, to repose upon the sea. They make their nests in the holes of precipitous rocks, or in the hollows of trees. The young, yet in the nest, gathered up in a ball, and covered with a down of the most brilliant white, have a resemblance to powder puffs. Of the long tail feathers, (sometimes twenty-four inches,) the Otaheitans make plumes for their warriors; and the Caribs used to pass them through the cartilage of the nose, to render themselves more haudsome, or more terrible.

caught the fish by the tail ; and consequently the fins prevent its being easily swallowed in that position. In this case, the bird is seen to toss its prey above its head, and very dexterously to catch it, when descending, by the proper end, and so swallow it with ease.

CHAP. V.

OF THE GANNET, OR SOLAND GOOSE.

THE Gannet is of the size of a tame goose, but its wings much longer, being six feet over. The bill is six inches long, straight almost to the point, where it inclines down, and the sides are irregularly jagged, that it may hold its prey with greater security. It differs from the cormorant in size, being larger ; and its colour, which is chiefly white ; and by its having no nostrils, but in their place a long furrow that reaches almost to the end of the bill. From the corner of the mouth is a narrow slip of black bare skin, that extends to the hind part of the head ; beneath the skin is another that, like the pouch of the pelican, is dilatable, and of size sufficient to contain five or six entire herrings, which in the breeding season it carries at once to its mate or its young.

These birds, which subsist entirely upon fish, chiefly resort to those uninhabited islands where their food is found in plenty, and men seldom come to disturb them. The islands to the north of Scotland, the Skelig islands off the coasts of Kerry in Ireland, and those that lie in the north sea off Norway, abound with them. But it is on the Bass island, in the Frith of Edinburgh, where they are seen in the greatest abundance. “ There is a small island,” says the celebrated Harvey, “ called the Bass, not more than a mile in circumference. The surface is almost wholly covered during the months of May and June with their nests, their eggs, and young. It is scarcely possible to walk without treading on them : the flocks of birds upon the wing, are so numerous, as to darken the air like a cloud ; and their noise is such, that one cannot without difficulty be heard by the person next to him. When one looks down upon the sea from

the precipice, its whole surface seems covered with infinite numbers of birds of different kinds, swimming and pursuing their prey. If, in sailing round the island, one surveys its hanging cliffs, in every crag, or fissure of the broken rocks, may be seen innumerable birds, of various sorts and sizes, more than the stars of heaven, when viewed in a serene night. If they are viewed at a distance, either receding, or in their approach to the island, they seem like one vast swarm of bees."

They are not less frequent upon the rocks of St Kilda. Martin assures us, that the inhabitants of that small island consume annually near twenty-three thousand young birds of this species, besides an amazing quantity of their eggs. On these they principally subsist throughout the year; and from the number of these visitants, make an estimate of their plenty for the season. They preserve both the eggs and fowls in small pyramidal stone buildings, covering them with turf ashes, to prevent the evaporation of their moisture.

The gannet is a bird of passage. In winter it seeks the more southern coasts of Cornwall, hovering over the shoals of herrings and pilchards that then come down from the northern seas; its first appearance in the northern islands is in the beginning of spring; and it continues to breed till the end of summer. But, in general, its motions are determined by the migrations of the immense shoals of herrings that come pouring down at that season through the British Channel, and supply all Europe, as well as this bird, with their spoil. The gannet assiduously attends the shoal in their passage, keeps with them in their whole circuit round our island, and shares with our fishermen this exhaustless banquet. As it is strong of wing, it never comes near the land; but is constant to its prey. Wherever the gannet is seen, it is sure to announce to the fishermen the arrival of the finny tribe; they then prepare their nets, and take the herrings by millions at a draught; while the gannet, who came to give the first information, comes, though an unbidden guest, and often snatches its prey from the fisherman even in his boat. While the fishing season continues, the gannets are busily employed; but when the pilchards disappear from our coasts, the gannet takes its leave to keep them company.

The cormorant has been remarked for the quickness of his sight; yet in this the gannet seems to exceed him. It is pos-

sessed of a transparent membrane under the eye-lid, with which it covers the whole eye at pleasure, without obscuring the sight in the smallest degree. This seems a necessary provision for the security of the eyes of so weighty a creature, whose method of taking its prey, like that of the cormorant, is by darting head-long down from a height of a hundred feet or more into the water to seize it.—These birds are sometimes taken at sea, by fastening a pilchard to a board, which they leave floating. The gannet instantly pounces down from above upon the board, and is killed or maimed by the shock of a body where it expected no resistance. ¹

These birds breed but once a year, and lay but one egg, which being taken away, they lay another; if that is also taken, then a third; but never more for that season. Their egg is white, and rather less than that of the common goose; and their nest large, composed of such substances as are found floating on the surface of the sea. The young birds, during the first year, differ greatly in colour from the old ones; being of a dusky hue, speckled with numerous triangular white spots; and at that time resembling the colours of the speckled diver.

The Bass island, where they chiefly breed, belongs to one proprietor; so that care is taken never to fright away the birds when laying, or to shoot them upon the wing. By that means, they are so confident as to alight and feed their young ones close beside you. They feed only upon fish, as was observed; yet the young gannet is counted a great dainty by the Scots, and is sold very dear; so that the lord of the islet makes a considerable annual profit by the sale.

CHAP. VI.

OF THE SMALLER GULLS AND PETRELS.

HAVING described the manners of the great ones of this tribe, those of the smaller kinds may be easily inferred. They resem-

¹ Mr Pennant says, that one of these birds flying over Penzance in Cornwall, saw some pilchards lying on a fir plank, where they had been placed for curing; and darting itself down with great violence, it struck its bill quite through an inch and quarter plank: it was killed on the spot.

ble the more powerful in their appetites for prey, but have not such certain methods of obtaining it. In general, therefore, the industry of this tribe, and their audacity, increase in proportion to their imbecility; the great gulls live at the most remote distance from man; the smaller are obliged to reside wherever they can take their prey; and to come into the most populous places, when solitude can no longer grant them a supply. In this class we may place the Gull, properly so called, of which there are above twenty different kinds; the Petrel, of which there are three; and the Sea-swallow, of which there are as many. The gulls may be distinguished by an angular knob on the lower chap; the petrels by their wanting this knob; and the sea-swallow by their bills, which are straight, slender, and sharp-pointed. They all, however, agree in their appetites, and their places of abode.*

* The *Petrels* have received this denomination whimsically enough. Besides the faculty of swimming, they possess that of supporting themselves on the water, by striking very rapidly with their feet, which has caused them to be compared to *St Peter* walking upon the water. The petrels are to be seen in all seas of the globe from one pole to the other. They are the inseparable companions of mariners, during their long navigations. The flight of these birds is almost always performed by hovering, and without presenting apparent vibrations. They rise with facility, and can fly against the strongest winds, which never slacken their movements. The tempest not only does not affright them, but they are almost necessitated to seek those seas where the agitation of the waves brings to the surface those marine animals which constitute their food. In consequence of this, they are frequently seen in all weathers, in the vortices which are formed by the track of vessels. "It is indeed an interesting sight," says Wilson, "to observe these little birds, in a gale, coursing over the waves, down the declivities, and up the ascents of the foaming surf that threatens to burst over their heads, sweeping along the hollow troughs of the sea as in a sheltered valley, and again mounting with the rising billow, and just above its surface, occasionally dropping their feet, which, striking the water, throw them up again with additional force, sometimes leaping, with both legs parallel, on the surface of the roughest waves for several yards at a time. Meanwhile they continue coursing from side to side of the ship's wake, making excursions far and wide to the right and to the left, now a great way ahead, and now shooting astern for several hundred yards, returning again to the ship as if she were all the while stationary, though perhaps running at the rate of ten knots an hour. But the most singular peculiarity of this bird is its faculty of standing, and even running on the surface of the water, which it performs with apparent facility. When any greasy matter is thrown overboard, these birds instantly collect around it, facing to windward, with their long wings expanded and their webbed feet patting the water. The lightness of their bodies, and the action of the wind on their wings, enable them

The gull, and all its varieties, is very well known in every part of the kingdom. It is seen with a slow-sailing flight, hovering over rivers to prey upon the smaller kinds of fish; it is seen following the ploughman in fallow fields to pick up insects; and

with ease to assume this position. In calm weather they perform the same manœuvre by keeping their wings just so much in action as to prevent their feet from sinking below the surface."

"There are," says the same writer in another place, "few persons who have crossed the Atlantic that have not observed these solitary wanderers of the deep, skimming along the surface of the wild and wasteful ocean; flitting past the vessel like swallows, or following in her wake, gleanings their scanty pittance of food from the rough and whirling surges. Habited in mourning, and making their appearance generally in greater numbers previous to or during a storm, they have long been fearfully regarded by the ignorant and superstitious, not only as the foreboding messengers of tempests and dangers to the hapless mariner, but as wicked agents, connected somehow or other in creating them. 'Nobody,' say they, 'can tell any thing of where they come from, or how they breed, though (as sailors sometimes say) it is supposed that they hatch their eggs under their wings as they sit on the water.' This mysterious uncertainty of their origin, and the circumstances above recited, have doubtless given rise to the opinion, so prevalent among this class of men, that they are in some way or other connected with the prince of the power of the air. In every country where they are known, their names have borne some affinity to this belief. They have been called witches, stormy petrels, the Devil's birds, and Mother Cary's chickens, probably from some celebrated ideal hag of that name; and their unexpected and numerous appearance has frequently thrown a momentary damp over the mind of the hardest seaman. It is the business of the naturalist, and the glory of philosophy, to examine into the reality of these things; to dissipate the clouds of error and superstition wherever they darken and bewilder the human understanding, and to illustrate nature with the radiance of truth."

When we inquire, accordingly, into the unvarnished history of this ominous bird, we find that it is by no means peculiar in presaging storms, for many others of very different families are evidently endowed with an equally nice perception of a change in the atmosphere. Hence it is that, before rain, swallows are seen more eagerly hawking for flies, and ducks carefully trimming their feathers, and tossing up water over their backs, to try whether it will run off again without wetting them. But it would be as absurd to accuse the swallows and ducks on that account of being the cause of rain, as to impute a tempest to the spiteful malice of the poor petrels. Seamen ought rather to be thankful to them for the warning which their delicate feelings of aerial change enable them to give of an approaching hurricane. "As well," says Wilson, "might they curse the midnight light-house that, star-like, guides them on their watery way; or the buoy that warns them of the sunken rocks below, as this harmless wanderer, whose manner informs them of the approach of the storm, and thereby enables them to prepare for it." The petrels are nocturnal birds. When, therefore, they are seen flying about and feeding by day, the fact appears to indicate that they have been driven from their usual quarters by a storm; and hence,

when living animal food does not offer, it has even been known to eat carrion, and whatever else of the kind that offers. Gulls are found in great plenty in every place ; but it is chiefly round our boldest rockiest shores that they are seen in the greatest

perhaps, arose the association of the bird with the tempest. Though the petrels venture to wing their way over the wide ocean, as fearlessly as our swallows do over a mill-pond, they are not, therefore, the less sensible to danger ; and, as if feelingly aware of their own weakness, they make all haste to the nearest shelter. When they cannot then find an island or a rock to shield them from the blast, they fly towards the first ship they can descrie, crowd into her wake, and even close under the stern, heedless, it would appear, of the rushing surge, so that they can keep the vessel between them and the unbroken sweep of the wind. It is not to be wondered at, in such cases, that their low wailing note of *weet, weet*, should add something supernatural to the roar of waves and whistling of the wind, and infuse an ominous dread into minds prone to superstition.

The popular opinion among sailors, that the petrels carry their eggs under their wings in order to hatch them, is no less unfounded than the fancy of their causing storms : it is, indeed, physically impossible. On the contrary, the petrels have been ascertained to breed on rocky shores, in numerous communities, like the bank-swallow, making their nests in the holes and cavities of the rocks above the sea, returning to feed their young only during the night, with the superabundant oily food from their stomachs. The quantity of this oily matter is so considerable, that, in the Faro Isles, they use petrels for candles, with no other preparation than drawing a wick through the body of the birds from the mouth to the rump. While nestling, they make a clattering or croaking noise, similar to frogs, which may be heard during the whole night on the shores of the Bahama and Bermuda Islands, and the coasts of Cuba and Florida, where they abound. Forster says they bury themselves by thousands in holes under ground, where they rear their young and lodge at night ; and at New Zealand, the shores resound with the noise, similar to the clucking of hens, or the croaking of frogs (Pontoppidan, speaking of those of Norway, says like the neighing of a horse), which they send forth from their concealment.

The *Gulls*, Buffon terms the vultures of the sea, for they feed upon carcasses of every description, which are either floating on its surface, or cast upon its shores. They swarm upon the borders of the sea, where they seek fish, either fresh or corrupted, flesh in the same states, worms, or mollusca, all of which their stomach is capable of digesting. Spread throughout the entire globe, they cover with their multitudes the shores, rocks, and cliffs, causing them to re-echo with their clamours. There are even some species which frequent the fresh waters, and some are to be met with at sea, at more than a hundred leagues distant from land. D'Azara, who has seen them, in innumerable quantities, near the slaughter houses of Monte Video, Buenos Ayres, and even in the squares, where they pick up the offal of the shambles, &c., and sometimes perch on the roofs, tells us that they proceed considerably to inland, whither they are attracted by dead animals.

They dart with such violence on their prey, that they will swallow both bait and hook, and spit themselves on the point placed by the fisher under

abundance ; it is there that the gull breeds and brings up its young ; it is there that millions of them are heard screaming with discordant notes for months together.

Those who have been much upon our coasts know that there are two different kinds of shores ; that which slants down to the water with a gentle declivity, and that which rises with a precipitate boldness, and seems set as a bulwark to repel the force of the invading deeps. It is to such shores as these that the whole tribe of the gull-kind resort, as the rocks offer them a retreat for their young, and the sea a sufficient supply. It is in the cavities of these rocks, of which the shore is composed, that the vast variety of sea-fowls retire to breed in safety. The waves beneath, that continually beat at the base, often wear the shore into an impending boldness ; so that it seems to jut out over the

the fish which he presents to them. It is, therefore, very natural that they should pursue individuals of their own species, in whose possession they see any food, a fact, moreover, of which we are constant eye-witnesses in other species, such as sparrows, hens, &c.

Gulls have been found by navigators in all latitudes ; they are, however, both more numerous and larger in the northern regions, where the carcasses of large fishes and cetacea present them with more abundant food, and it is on the desert islands of the two polar zones, where they are undisturbed, that they prefer to nestle. They deposit their eggs either in a hole upon the sand, or in the crevices of rocks ; but in less deserted countries the smaller species seek the borders of waters, or of the sea, which are covered with plants. The *Sea-new* is a species of gull, distinguished from the rest by its black and white pie-bald appearance, although the individuals vary from each other in the colour of their plumage.

The *Terns* have been also called *Sea Swallows*, from the resemblance of their forked tail, long wings, and their constant habit of shaving the surface of the water in all directions, in pursuit of small fish. But the term is exceedingly objectionable, as tending to the inter-confusion of birds of such different orders, and such essential differences of conformation and habits. The terns are continually on the wing, and, though web-footed, are not seen to swim ; they rest but seldom, and only on the land ; their food consists, for the most part, in small fish and mollusca, which they seize upon the surface of the water ; but they also catch aerial insects. In flying they send forth sharp and piercing cries, especially during nestling time. In calm weather they sometimes rise very high, and are often seen to come plump down. The young differ from the adult and aged, only before the moulting, which is double in the known species, and there is no external difference between the two sexes. The females deposit their eggs, usually two or three in number, in a cavity, and these nests are sometimes so close, that the sitting birds touch each other. Terns are found in both continents, from the seas, lakes, and rivers of the north, as far as the vast coasts of the Austral Ocean, and in almost all the intermediate climates.

water, while the raging of the sea makes the place inaccessible from below. These are the situations to which sea-fowl chiefly resort, and bring up their young in undisturbed security.

Those who have never observed our boldest coasts, have no idea of their tremendous sublimity. The boasted works of art, the highest towers, and the noblest domes, are but ant-hills when put in comparison: the single cavity of a rock often exhibits a coping higher than the ceiling of a Gothic Cathedral. The face of the shore offers to the view a wall of massive stone, ten times higher than our tallest steeples. What should we think of a precipice three quarters of a mile in height? and yet the rocks of St Kilda are still higher! What must be our awe to approach the edge of that impending height, and to look down on the unfathomable vacuity below; to ponder on the terrors of falling to the bottom, where the waves that swell like mountains are scarcely seen to curl on the surface, and the roar of an ocean a thousand leagues broad appears softer than the murmur of a brook! it is in these formidable mansions that myriads of sea-fowls are for ever seen sporting, flying in security down the depth, half a mile beneath the feet of the spectator. The crow and the chough avoid those frightful precipices; they choose smaller heights, where they are less exposed to the tempest; it is the cormorant, the gannet, the tarrock, and the terne, that venture to these dreadful retreats, and claim an undisturbed possession. To the spectator from above, those birds, though some of them are above the size of an eagle, seem scarcely as large as a swallow; and their loudest screaming is scarcely perceptible.

But the generality of our shores are not so formidable. Though they may rise two hundred fathoms above the surface, yet it often happens that the water forsakes the shore at the departure of the tide, and leaves a noble and delightful walk for curiosity on the beach. Not to mention the variety of shells with which the sand is strewed, the lofty rocks that hang over the spectator's head, and that seem but just kept from falling, produce in him no unpleasing gloom. If to this be added the fluttering, the screaming, and the pursuits of myriads of water-birds, all either intent on the duties of incubation, or roused at the presence of a stranger, nothing can compose a scene of more peculiar solemnity. To walk along the shore when the tide is departed, or to sit in the hollow of a rock when it is come in,

attentive to the various sounds that gather on every side, above and below, may raise the mind to its highest and noblest exertions. The solemn roar of the waves swelling into and subsiding from the vast caverns beneath, the piercing note of the gull, the frequent chatter of the guillemot, the loud note of the hawk, the scream of the heron, and the hoarse deep periodical croaking of the cormorant, all unite to furnish out the grandeur of the scene, and turn the mind to HIM who is the essence of all sublimity.

Yet it often happens that the contemplation of a seashore produces ideas of an humbler kind, yet still not unpleasing. The various arts of these birds to seize their prey, and sometimes to elude their pursuers, their society among each other, and their tenderness and care of their young, produce gentler sensations. It is ridiculous also now and then to see their various ways of imposing upon each other. It is common enough, for instance, with the arctic gull, to pursue the lesser gulls so long, that they drop their excrements through fear, which the hungry hunter quickly gobbles up before it ever reaches the water. In breeding too they have frequent contests; one bird who has no nest of her own, attempts to dispossess another, and puts herself in the place. This often happens among all the gull-kind: and I have seen the poor bird, thus displaced by her more powerful invader, sit near the nest in pensive discontent, while the other seemed quite comfortable in her new habitation. Yet this place of pre-eminence is not easily obtained; for the instant the invader goes to snatch a momentary sustenance, the other enters upon her own, and always ventures another battle before she relinquishes the justness of her claim. The contemplation of a cliff thus covered with hatching birds, affords a very agreeable entertainment; and as they sit upon the ledges of the rocks, one above another, with their white breasts forward, the whole group has not unaptly been compared to an apothecary's shop.

These birds, like all others of the rapacious kind, lay but few eggs; and hence, in many places, their number is daily seen to diminish. The lessening of so many rapacious birds may, at first sight, appear a benefit to mankind; but when we consider how many of the natives of our islands are sustained by their flesh, either fresh or salted, we shall find no satisfaction in thinking that these poor people may in time lose their chief support.

The gull, in general, as was said, builds on the ledges of rocks, and lays from one egg to three, in a nest formed of long grass and sea-weed. Most of the kind are fishy tasted, with black stringy flesh ; yet the young ones are better food : and of these, with several other birds of the penguin kind, the poor inhabitants of our northern islands make their wretched banquets. They have been long used to no other food ; and even salted gull can be relished by those who know no better. Almost all delicacy is a relative thing ; and the man who repines at the luxuries of a well-served table, starves not for want, but from comparison. The luxuries of the poor are indeed coarse to us, yet still they are luxuries to those ignorant of better ; and it is probable enough that a Kilda or a Feroe man may be found to exist, outdoing Apicius himself in consulting the pleasures of the table. Indeed, if it be true that such meat as is the most dangerously earned is the sweetest, no men can dine so luxuriously as these, as none venture so hardily in the pursuit of a dinner. In Jacobson's History of the Feroe islands, we have an account of the method in which those birds are taken ; and I will deliver it in his own simple manner.

“ It cannot be expressed with what pains and danger they take these birds in those high steep cliffs, whereof many are two hundred fathoms high. But there are men apt by nature, and fit for the work, who take them usually in two manners ; they either climb from below into these high promontories, that are as steep as a wall ; or they let themselves down with a rope from above. When they climb from below, they have a pole five or six ells long with an iron hook at the end, which they that are below in the boat, or on the cliff, fasten unto the man's girdle, helping him up thus to the highest place where he can get footing ; afterwards they also help up another man ; and thus several climb up as high as they possibly can ; and, where they find difficulty, they help each other up, by thrusting one another up with their poles. When the first hath taken footing, he draws the other up to him, by the rope fastened to his waist ; and so they proceed, till they come to the place where the birds build. They there go about as well as they can in those dangerous places ; the one holding the rope at one end, and fixing himself to the rock ; the other going at the other end from place to place. If it should happen that he chanceth to fall, the other

that stands firm keeps him up, and helps him up again. But if he passeth safe, he likewise fastens himself till the other has passed the same dangerous place also. Thus they go about the cliffs after birds as they please. It often happeneth, however, (the more is the pity) that when one doth not stand fast enough, or is not sufficiently strong to hold up the other in his fall, that they both fall down, and are killed. In this manner some do perish every year."

Mr Peter Clanson, in his description of Norway, writes, that there was anciently a law in that country, that whosoever climbed so on the cliffs that he fell down and died, if the body was found before burial, his next kinsman should go the same way; but if he durst not, or could not do it, the dead body was not then to be buried in sanctified earth, as the person was too full of temerity, and his own destroyer.

"When the fowlers are come, in the manner aforesaid, to the birds within the cliffs, where people seldom come, the birds are so tame, that they take them with their hands; for they will not readily leave their young. But when they are wild, they cast a net, with which they are provided, over them, and entangle them therein. In the meantime, there lieth a boat beneath in the sea, wherein they cast the birds killed; and, in this manner, they can in a short time fill a boat with fowl. When it is pretty fair weather, and there is good fowling, the fowlers stay in the cliff seven or eight days together; for there are here and there holes in the rocks, where they can safely rest; and they have meat let down to them with a line from the top of the mountain. In the meantime some go every day to them, to fetch home what they have taken.

"Some rocks are so difficult, that they can in no manner get unto them from below; wherefore they seek to come down thereunto from above. For this purpose they have a rope eighty or a hundred fathoms long, made of hemp, and three fingers thick. The fowler maketh the end of this fast about his waist, and between his legs, so that he can sit thereon; and is thus let down, with the fowling-staff in his hand. Six men hold by the rope, and let him easily down, laying a large piece of wood on the brink of the rock, upon which the rope glideth, that it may not be worn to pieces by the hard and rough edge of the stone. They have, besides, another small line, that is fastened to the

fowler's body ; on which he pulleth, to give them notice how they should let down the great rope, either lower or higher ; or to hold still, that he may stay in the place whereunto he is come. Here the man is in great danger, because of the stones that are loosened from the cliff, by the swinging of the rope, and he cannot avoid them. To remedy this, in some measure, he hath usually on his head a seaman's thick and shaggy cap, which defends him from the blows of the stones, if they be not too big ; and then it costeth him his life : nevertheless, they continually put themselves in that danger, for the wretched body's food sake, hoping in God's mercy and protection, unto which the greatest part of them do devoutly reecomend themselves when they go to work : otherwise, they say, there is no other great danger in it, except that it is a toilsome and artificia! labour ; for he that hath not learned to be so let down, and is not used thereto, is turned about with the rope, so that he soon groweth giddy, and can do nothing ; but he that hath learned the art, considers it as a sport, swings himself on the rope, sets his feet against the rock, casts himself some fathoms from thence, and shoots himself to what place he will : he knows where the birds are, he understands how to sit on the line in the air, and how to hold the fowling-staff in his hand ; striking therewith the birds that come or fly away : and when there are holes in the rocks, and it stretches itself out, making underneath as a ceiling under which the birds are, he knoweth how to shoot himself in among them, and there take firm footing. There, when he is in these holes, he maketh himself loose of the rope, which he fastens to a crag of the rock, that it may not slip from him to the outside of the cliff. He then goes about in the rock, taking the fowl either with his hands or the fowling-staff. Thus, when he hath killed as many birds as he thinks fit, he ties them in a bundle, and fastens them to a little rope, giving a sign, by pulling, that they should draw them up. When he has wrought thus the whole day, and desires to get up again, he sitteth once more upon the great rope, giving a new sign that they should pull him up ; or else he worketh himself up, climbing along the rope, with his girdle full of birds. It is also usual, where there are not folks enough to hold the great rope, for the fowler to drive a post sloping into the earth, and to make a rope fast therefrom, by which he lets himself down without any body's help, to work in

the manner aforesaid. Some rocks are so formed that the person can go into their cavities by land.

“ These manners are more terrible and dangerous to see than to describe ; especially if one considers the steepness and height of the rocks, it seeming impossible for a man to approach them, much less to climb or descend. In some places, the fowlers are seen climbing where they can only fasten the ends of their toes and fingers ; not shunning such places, though there be a hundred fathom between them and the sea. It is a dear meat for these poor people, for which they must venture their lives ; and many, after long venturing, do at last perish therein.

“ When the fowl is brought home, a part thereof is eaten fresh ; another part, when there is much taken, being hung up for winter provision. The feathers are gathered to make merchandise of, for other expenses. The inhabitants get a great many of these fowls, as God giveth his blessing and fit weather. When it is dark and hazy, they take most ; for then the birds stay in the rocks : but in clear weather, and hot sun-shine, they seek the sea. When they prepare to depart for the season, they keep themselves most there, sitting on the cliffs towards the sea-side, where people get at them sometimes with boats, and take them with fowling-staves.”

Such is the account of this historian ; but we are not to suppose that all the birds caught in this manner are of the gull-kind : on the contrary, numbers of them are of the penguin kind ; auks, puffins, and guillemots. These all come, once a season, to breed in these recesses ; and retire in winter to fish in more southern climates.

CHAP. VII.

OF THE PENGUIN KIND : AND FIRST, OF THE GREAT MAGELLANIC PENGUIN.

THE gulls are long-winged, swift flyers, that hover over the most extensive seas, and dart down upon such fish as approach too near the surface. The penguin kind are but ill fitted for flight, and still less for walking. Every body must have seen

the awkward manner in which a duck, either wild or tame, attempts to change place. they must recollect with what softness and ease a gull or a kite waves its pinions, and with what a coil and flutter the duck attempts to move them; how many strokes it is obliged to give, in order to gather a little air; and even when it is thus raised, how soon it is fatigued with the force of its exertions, and obliged to take rest again. But the duck is not, in its natural state, half so unwieldy an animal as the whole tribe of the penguin kind. Their wings are much shorter, more scantily furnished with quills, and the whole pinion placed too forward to be usefully employed. For this reason, the largest of the penguin kind, that have a thick heavy body to raise, cannot fly at all. Their wings serve them rather as paddles to help them forward, when they attempt to move swiftly, and in a manner walk along the surface of the water. Even the smallest kinds seldom fly by choice; they flutter their wings with the swiftest efforts without making way; and though they have but a small weight of body to sustain, yet they seldom venture to quit the water, where they are provided with food and protection.

As the wings of the penguin tribe are unfitted for flight, their legs are still more awkwardly adapted for walking. This whole tribe have all above the knee hid within the belly: and nothing appears but two short legs, or feet, as some would call them, that seem stuck under the rump, and upon which the animal is very awkwardly supported. They seem, when sitting, or attempting to walk, like a dog that has been taught to sit up, or to move a minuet. Their short legs drive the body in progression from side to side; and were they not assisted by their wings, they could scarcely move faster than a tortoise.

This awkward position of the legs, which so unqualifies them for living upon land, adapts them admirably for a residence in water. In that, the legs placed behind the moving body, pushes it forward with the greater velocity; and these birds, like Indian canoes, are the swiftest in the water, by having their paddles in the rear. Our sailors, for this reason, give these birds the very homely, but expressive, name of *arse-feet*.

Nor are they less qualified for diving than swimming. By ever so little inclining their bodies forward, they lose their centre of gravity; and every stroke from their feet only tends to

sink them the faster. In this manner they can either dive at once to the bottom, or swim between two waters; where they continue fishing for some minutes, and then ascending, catch an instantaneous breath, to descend once more to renew their operations. Hence it is, that these birds, which are so defenseless, and so easily taken by land, are impregnable by water. If they perceive themselves pursued in the least, they instantly sink, and show nothing more than their bills, till the enemy is withdrawn. Their very internal conformation assists their power of keeping long under water. Their lungs are fitted with numerous vacuities, by which they can take in a very large inspiration; and this probably serves them for a length of time.

As they never visit land, except when they come to breed, their feathers take a colour from their situation. That part of them which has been continually bathed in the water, is white; while their backs and wings are of different colours, according to the different species. They are also covered more warmly all over the body with feathers, than any other birds whatever; so that the sea seems entirely their element: and but for the necessary duties of propagating their species, we should scarcely have the smallest opportunity of seeing them, and should be utterly unacquainted with their history.*

* The *Crested Penguin*, which is the most beautiful of the penguin tribe is nearly two feet in length. The bill is red, and three inches long; the upper mandible curved at the end, and the lower obtuse. The head, neck back, and sides, are black. Over each eye there is a stripe of pale yellow feathers, which lengthens into a crest about four inches long; this is decumbent, but can be erected at pleasure: the feathers of the head above this are longer than the rest, and stand upward. The wings are black on the outside, but the edges and the inside are white. The legs are orange-coloured and the claws dusky. The female is destitute of the crest. These birds have also the names of hopping penguins, and jumping jack, from their action of leaping quite out of the water, sometimes three or four feet, on meeting with any obstacle in their course; and, indeed, they frequently do this without any other apparent cause than the desire of advancing by that means. They are inhabitants of several of the South Sea islands.

This species seems to have a greater air of liveliness in its countenance than almost any of the others; yet it is a very stupid bird, and so regardless of its own safety as even to suffer any person to lay hold of it. When provoked it erects its crest in a very beautiful manner; and when attacked by our voyagers, we are told it ran at them in flocks, pecked their legs, and spoiled their clothes. Mr Forster, in his account of one of the South Sea islands, says, "When the whole herd was beset, they all became very bold at once, and ran violently at us, biting our legs, or any part of our clothes."

Of all this tribe, the Magellanic Penguin is the largest, and the most remarkable. In size it approaches near that of a tame goose. It never flies, as its wings are very short, and covered with stiff hard feathers, and are always seen expanded, and hanging uselessly down by the bird's sides. The upper part of the head, back, and rump, are covered with stiff black feathers; while the belly and breast, as is common with all of this kind, are of a snowy whiteness, except a line of black that is seen to cross the crop. The bill, which from the base to about half way is covered with wrinkles, is black, but marked crosswise with a stripe of yellow. They walk erect, with their heads on high, their fin-like wings hanging down like arms; so that to see

They are very tenacious of life. Mr Forster left a great number of them apparently lifeless, from the blows they had received, while he went in pursuit of others; but they all afterwards got up, and marched off with the utmost gravity. Their sleep is extremely sound; for Dr Sparrman, accidentally stumbling over one of them, kicked it several yards, without disturbing its rest; nor was it till after being repeatedly shaken that the bird awoke.

The crested penguins form their nests among those of the birds of the pelican tribe, and live in tolerable harmony with them. The female generally lays only a single egg. Their nests are holes in the earth, which they easily form with their bills, throwing back the dirt with their feet. They are often found in great numbers on the shores where they have been bred.

Perrin, in his "Account of an expedition to the Falkland islands in 1772," mentions a species of penguin that resorts to certain places of these islands in incredible numbers, and lays its eggs. These places, he says, had become, by its long residence, entirely freed from grass; and has given to them the name of towns. These nests were composed of mud, raised into hillocks about a foot high, and placed close to each other. "Here," he adds, "during the breeding season, we were presented with a sight that conveyed a most dreary, and I may say awful idea of the desertion of the islands by the human species: general stillness prevailed in these towns; and whenever we took our walks among them, in order to provide ourselves with eggs, we were regarded indeed with side-long glances, but we carried no terror with us. The eggs are rather larger than those of a goose, and are laid in pairs. When we took them once, and sometimes twice in a season, they were as often replaced by the birds; but prudence would not permit us to plunder too far, lest a future supply, in the next year's brood, might be prevented."

The *Patagonian Penguin* inhabits the Falkland islands and New Guinea; is four feet three inches long. The bill and legs are black; and the ears have a golden spot: lower mandible tawny at the base; irides hazel; the head and hind part of the neck is brown; the back is of a black-blue colour; the breast, belly, and vent, are white.

The *Manchots* bear a close relation to the Penguins, but are found only in the Antarctic seas and islands, while the Penguins inhabit the northern seas. Instead of wings, they have simple winglets, which perform the office of oars or fins.

them at a distance, they look like so many children with white aprons. From hence they are said to unite in themselves the qualities of men, fowls, and fishes. Like men, they are upright ; like fowls, they are feathered ; and like fishes, they have fin-like instruments, that beat the water before, and serve for all the purposes of swimming, rather than flying.

They feed upon fish ; and seldom come ashore, except in the breeding season. As the seas in that part of the world abound with a variety, they seldom want food ; and their extreme fatness seems a proof of the plenty in which they live. They dive with great rapidity, and are voracious to a great degree. One of them, described by Clusius, though but very young, would swallow an entire herring at a mouthful, and often three successively before it was appeased. In consequence of this gluttonous appetite, their flesh is rank and fishy ; though our sailors say, that *it is pretty good eating*. In some the flesh is so tough, and the feathers so thick, that they stand the blow of a scimitar without injury.

They are a bird of society ; and, especially when they come on shore, they are seen drawn up in rank and file, upon the ledge of a rock, standing together with the albatross, as if in consultation. This is previous to their laying, which generally begins, in that part of the world, in the month of November. Their preparations for laying are attended with no great trouble, as a small depression in the earth, without any other nest, serves for this purpose. The warmth of their feathers and the heat of their bodies is such, that the progress of incubation is carried on very rapidly.

But there is a difference in the manner of this bird's nestling in other countries, which I can only ascribe to the frequent disturbances it has received from man or quadrupeds in its recesses. In some places, instead of contenting itself with a superficial depression in the earth, the penguin is found to burrow two or three yards deep : in other places it is seen to forsake the level, and to clamber up the ledge of a rock, where it lays its egg, and hatches it in that bleak exposed situation. These precautions may probably have been taken, in consequence of dear-bought experience. In those places where the bird fears for her own safety, or that of her young, she may providently provide against danger, by digging, or even by climbing ; for both which she is

but ill adapted by nature. In those places, however, where the penguin has had but few visits from man, her nest is made, with the most confident security, in the middle of some large plain, where they are seen by thousands. In that unguarded situation, neither expecting nor fearing a powerful enemy, they continue to sit brooding; and even when man comes among them, have at first no apprehension of their danger. Some of this tribe have been called by our seamen, *the Booby*,* from the total insensibility which they show when they are sought to their destruction. But it is not considered that these birds have never been taught to know the dangers of a human enemy: it is against the fox or the vulture that they have learned to defend themselves; but they have no idea of injury from a being so very unlike their natural opposers. The penguins, therefore, when our seamen first came among them, tamely suffered themselves to be knocked on the head, without even attempting an escape. They have stood to be shot at in flocks, without offering to move, in silent wonder, till every one of their number has been destroyed. Their attachment to their nests was still more powerful; for the females tamely suffered the men to approach and take their eggs without any resistance. But the experience of a few of those unfriendly visits, has long since taught them to be more upon their guard in choosing their situations; or to leave those retreats where they were so little able to oppose their invaders.

The penguin lays but one egg; and, in frequented shores, is found to burrow like a rabbit: sometimes three or four take possession of one hole, and hatch their young together. In the holes of the rocks, where nature has made them a retreat, several of this tribe, as Linnæus assures us, are seen together. There the females lay their single egg, in a common nest, and sit upon this, their general possession, by turns; while one is placed as a sentinel, to give warning of approaching danger. The egg of the penguin, as well as of all this tribe, is very large for the size of the bird, being generally found bigger than that of a goose. But as there are many varieties of the penguin, and as they differ in size, from that of a Muscovy duck to a swan, the eggs differ in the same proportion.

* The *Booby* will be found described in a note to a former page. It belongs to the pelican tribe, and not to the penguins.

CHAP. VIII.

OF THE AUK, PUFFIN, AND OTHER BIRDS OF THE PENGUIN KIND.

OF a size far inferior to the penguin, but with nearly the same form, and exactly of the same appetites and manners, there is a very numerous tribe. These frequent our shores, and, like the penguin, have their legs placed behind. They have short wings, which are not totally incapable of flight; with round bills for seizing their prey, which is fish. They live upon the water, in which they are continually seen diving; and seldom venture upon land, except for the purposes of continuing their kind.

The first of this smaller tribe is the Great Northern Diver, which is nearly the size of a goose: it is beautifully variegated all over with many strips, and differs from the penguin, in being much slenderer, and more elegantly formed. The Gray Speckled Diver does not exceed the size of a Muscovy duck; and, except in size, greatly resembles the former. The Auk, which breeds on the islands of St Kilda, chiefly differs from the penguin in size and colour: it is smaller than a duck; and the whole of the breast and belly, as far as the middle of the throat, is white. The Guillemot is about the same size; it differs from the auk, in having a longer, a slenderer, and a straighter bill. The Scarlet-Throated Diver may be distinguished by its name; and the Puffin, or Coulterneb, is one of the most remarkable birds we know.*

* The *Great Northern Diver*, which is the principal of the auk tribe, is nearly three feet and a half in length. The bill is black, and is four inches and a half long. The head and neck are of a deep velvet black. Under the chin is a patch of white, marked with several parallel lines of black; and on each side of the neck, and on the breast, is also a large portion of white marked in a similar manner. The upper parts are black, marked with white spots; and the under parts are white; the wings are short; and the quills, tail, and legs, are black. The female is less than the male. It inhabits chiefly the northern seas, and is common on some of the coasts of Scotland. Every part and proportion of this bird is most admirably adapted to its mode of life. The head is sharp, and smaller than the part of the neck adjoining, in order that it may pierce the water; the wings are placed forward, and out of the centre of gravity, for a purpose which will be noticed hereafter; the thighs quite at the prodix, in order to facilitate diving; and the legs are flat, and as sharp backwards almost as the edge of a knife, that, in striking they may easily cut the water; while the feet are broad for swimming, yet so folded up, when advanced forward to take a fresh stroke, as to be full as

Words cannot easily describe the form of the bill of the puffin, which differs so greatly from that of any other bird. Those who have seen the coulter of a plough, may form some idea of the beak of this odd-looking animal. The bill is flat; but, very

narrow as the shank. The two exterior toes of the feet are longest; and the nails are flat and broad, resembling the human, which give strength, and increase the power of swimming. The foot, when expanded, is not at right angles with the leg; but the exterior part inclining towards the head, forms an acute angle with the body, the intention being, not to give motion in the line of the legs themselves, but, by the combined impulse of both in an intermediate line, the line of the body.

Most people, who have exercised any degree of observation, know that the swimming of birds is nothing more than a walking in the water, where one foot succeeds the other, as on the land. "But no one, as far as I am aware," says the Rev. Mr White, "has remarked, that diving fowls, while under water, impel and row themselves forward by a motion of their wings, as well as by the impulse of their feet; yet such is really the case, as any one may easily be convinced who will observe ducks when hunted by dogs in a clear pond. Nor do I know that any one has given a reason why the wings of diving fowls are placed so forward; doubtless not for the purpose of promoting their speed in flying, since that position certainly impedes it; but probably for the increase of their motion under water, by the use of four oars instead of two; and were the wings and feet nearer together, as in land birds, they would, when in action, rather hinder than assist one another."

The Speckled Diver is not quite so large as the other.

The Great Auk.—This bird inhabits Europe and America; is three feet in length; is very timid; it has not the power of flying; its food is chiefly fishes. The bill is black, compressed, and edged; and has eight or ten grooves: there is an oval spot on each side before the eyes. The wings are so short as to appear as only rudiments; secondary quill feathers tipped with white; the legs are black. Its egg is six inches long, and white, with purplish lines and spots.

The Little Auk also inhabits Europe and America, and measures nine inches in length. The bill is short, black, smooth, and conic; the back is black, with a few dusky lines; the secondary quill feathers are tipped with white. It has a white dot above the eyes; the tips of the hind quill feathers are white; the legs are black.

The Guillemot is about the size of a common duck. The upper parts of the body are of a dark brown colour, inclining to a black, except the tips of some of the wing feathers, which are white; all the under parts of the body are also white. The tail is about two inches long. These are simple birds, and easily taken. They generally join company with other birds, and breed on the inaccessible rocks and steep cliffs in the Isle of Man; and likewise in Cornwall; on Priesholm Island, near Beaumaris, in the isle of Anglesey; also on the Fern Island, near Northumberland; and the cliffs about Scarborough, in Yorkshire; and several other places in England. They lay exceeding large eggs, being full three inches long, blunt at the one end, sharp at the other, of a sort of bluish colour, spotted generally with some black spots or strokes.

different from that of a duck, its edge is upwards : it is of a triangular figure, and ending in a sharp point, the upper chap bent a little downward, where it is joined to the head ; and a certain callous substance encompassing its base, as in parrots. It is of two colours ; ash-coloured near the base, and red towards the point. It has three furrows or grooves impressed in it ; one in the livid part, two in the red. The eyes are fenced with a protuberant skin, of a livid colour ; and they are gray or ash-coloured. These are marks sufficient to distinguish this bird by ; but its value to those in whose vicinity it breeds, renders it still more an object of curiosity.

The puffin, like all the rest of this kind, has its legs thrown so far back, that it can hardly move without tumbling. This makes it rise with difficulty, and subject to many falls before it gets upon the wing : but as it is a small bird, not much bigger than a pigeon, when it once rises, it can continue its flight with great celerity.

Both this and all the former build no nest ; but lay their eggs either in the crevices of rocks, or in holes under ground near the shore. They chiefly choose the latter situation ; for the puffin, the auk, the guillemot, and the rest, cannot easily rise to the nest when in a lofty situation. Many are the attempts these birds are seen to make to fly up to those nests which are so high above the surface. In rendering them inaccessible to mankind, they often render them almost inaccessible to themselves. They

The Black Guillemot.—The length of the black guillemot is about fourteen inches, breadth twenty-two, and its weight fourteen ounces. In some of this species the whole plumage is black ; in others the lesser quills are tipped with white ; and all those that remain in the northern climates are said to turn white in winter. These birds are found in great numbers in the north-sea, in Greenland, Iceland, Spitzbergen, and the Feroe isles ; and when the winter sets in, they migrate southward along the shores of Scotland and England, where some of them remain and breed. The nest is made in the deep crevices of rocks which overhang the sea ; the eggs are of a gray colour. Some ornithologists assert, that the female lays only one : others, that she lays two. They fly commonly in pairs, and so low that they raise the surface of the sea by the flapping of their narrow wings. The Greenlanders eat the flesh of this bird, and use its skin for clothing, and the legs as a bait for their fishing-lines. Ray, Albin, Willoughby, and Edwards have named it the Greenland dove, or sea-turtle. In the Orkneys it is called the tyste.

The *Grebes* belong to this family of birds. They are not web-footed, but the toes are enlarged as in the coots. They live on lakes and ponds, and build in the rushes. Their plumage, which changes much with age, is used frequently by furriers.

are frequently obliged to make three or four efforts, before they can come at the place of incubation. For this reason, the auk and guillemot, when they have once laid their single egg, which is extremely large for the size, seldom forsake it until it is excluded. The male, who is better furnished for flight, feeds the female during this interval; and so bare is the place where she sits, that the egg would often roll down from the rock, did not the body of the bird support it.

But the puffin seldom chooses these inaccessible and troublesome heights for its situation. Relying on its courage and the strength of its bill, with which it bites most terribly, it either makes or finds a hole in the ground, where to lay and bring forth its young. All the winter these birds, like the rest, are absent; visiting regions too remote for discovery. At the latter end of March, or the beginning of April, come over a troop of their spies or harbingers, that stay two or three days, as it were to view and search out for their former situations, and see whether all be well. This done, they once more depart; and about the beginning of May, return again with the whole army of their companions. But if the season happens to be stormy and tempestuous, and the sea troubled, the unfortunate voyagers undergo incredible hardships; and they are found, by hundreds, cast away upon the shores, lean and perished with famine.¹ It is most probable, therefore, that this voyage is performed more on the water than in the air; and as they cannot fish in stormy weather, their strength is exhausted before they can arrive at their wished-for harbour.

The puffin, when it prepares for breeding, which always happens a few days after its arrival, begins to scrape up a hole in the ground not far from the shore; and when it has some way penetrated the earth, it then throws itself upon its back, and with bill and claws thus burrows inward, till it has dug a hole with several windings and turnings, from eight to ten feet deep. It particularly seeks to dig under a stone, where it expects the greatest security. In this fortified retreat it lays one egg; which, though the bird be not much bigger than a pigeon, is of the size of a hen's.

When the young one is excluded, the parent's industry and courage is incredible. Few birds or beasts will venture to at-

¹ Willoughby's Ornith. p. 326.

tack them in their retreats. When the great sea-raven, as Jacobson informs us, comes to take away their young, the puffins boldly oppose him. Their meeting affords a most singular combat. As soon as the raven approaches, the puffin catches him under the throat with its beak, and sticks its claws into its breast, which makes the raven, with a loud screaming, attempt to get away; but the little bird still holds fast to the invader, nor lets him go till they both come to the sea, where they drop down together, and the raven is drowned; yet the raven is but too often successful; and, invading the puffin at the bottom of its hole, devours both the parent and its family.

But were a punishment to be inflicted for immorality in irrational animals, the puffin is justly a sufferer from invasion, as it is often itself one of the most terrible invaders. Near the isle of Anglesey, in an islet called *Priesholm*, their flocks may be compared, for multitude, to swarms of bees. In another islet, called *the Calf of Man*, a bird of this kind, but of a different species, is seen in great abundance. In both places, numbers of rabbits are found to breed; but the puffin, unwilling to be at the trouble of making a hole, when there is one ready made, dispossesses the rabbits, and it is not unlikely destroys their young. It is in these unjustly acquired retreats that the young puffins are found in great numbers, and become a very valuable acquisition to the natives of the place. The old ones (I am now speaking of the Manks puffin) early in the morning, at break of day, leave their nests and young, and even the island, nor do they return till night-fall. All this time they are diligently employed in fishing for their young; so that their retreats on land, which in the morning were loud and clamorous, are now still and quiet, with not a wing stirring till the approach of dusk, when their screams once more announce their return. Whatever fish, or other food, they have procured in the day, by night begins to suffer a kind of half digestion, and is reduced to an oily matter, which is ejected from the stomach of the old ones into the mouth of the young. By this they are nourished, and become fat to an amazing degree. When they are arrived to their full growth, they who are intrusted by the lord of the island, draw them from their holes; and, that they may more readily keep an account of the number they take, cut off one foot as a token. Their flesh is said to be excessively rank, as they feed upon fish, especially sprats, and

sea weed ; however, when they are pickled and preserved with spices, they are admired by those who are fond of high eating. We are told, that formerly their flesh was allowed by the church on Lenten days. They were, at that time, also taken by ferrets, as we do rabbits. At present, they are either dug out, or drawn out, from their burrows, with a hooked stick. They bite extremely hard, and keep such fast hold of whatsoever they seize upon, as not to be easily disengaged. Their noise, when taken, is very disagreeable, being like the efforts of a dumb person attempting to speak.

The constant depredation which these birds annually suffer, does not in the least seem to intimidate them, or drive them away ; on the contrary, as the people say, the nest must be robbed or the old ones will breed there no longer. All birds of this kind lay but one egg ; yet if that be taken away, they will lay another, and so on to a third ; which seems to imply, that robbing their nests does not much intimidate them from laying again. Those, however, whose nests have been thus destroyed, are often too late in bringing up their young ; who, if they be not fledged and prepared for migration when all the rest depart, are left at land to shift for themselves. In August the whole tribe is seen to take leave of their summer residence ; nor are they observed any more till the return of the ensuing spring. It is probable that they sail away to more southern regions, as our mariners frequently see myriads of water-fowl upon their return, and steering usually to the north. Indeed the coldest countries seem to be their most favoured retreats ; and the number of water-fowl is much greater in those colder climates than in the warmer regions near the line. The quantity of oil which abounds in their bodies, serves as a defence against cold, and preserves them in vigour against its severity ; but the same provision of oil is rather detrimental in warm countries, as it turns rancid, and many of them die of disorders which arise from its putrefaction. In general, however, water-fowl can be properly said to be of no climate ; the element upon which they live being their proper residence. They necessarily spend a few months of summer upon land, to bring up their young ; but the rest of their time is probably consumed in their migrations, or near some unknown coasts, where their provision of fish is found in greatest abundance.

Before I go to the third general division of water-fowls, it may not be improper to observe, that there is one species of round-billed water-fowl that does not properly lie within any of the former distributions. This is the Gooseander ;* a bird with the body and wings shaped like those of the penguin kind, but with legs not hid in the belly. It may be distinguished from all others by its bill, which is round, hooked at the point, and toothed, both upper and under chap, like a saw. Its colours are various and beautiful ; however, its manners and appetites entirely resemble those of the diver. It feeds upon fish, for which it dives ; and is said to build its nest upon trees, like the heron and the cormorant. It seems to form the shade between the penguin and the goose kind ; having a round bill like the one ; and unembarrassed legs, like the other. In the shape of the head, neck, and body, it resembles them both.

CHAP. IX.

OF BIRDS OF THE GOOSE KIND, PROPERLY SO CALLED.

THE Swan, the Goose, and the Duck, are leaders of a numerous, useful, and beautiful tribe of birds, that we have reclaimed from a state of nature, and have taught to live in dependence about us. To describe any of these, would be as superfluous as definitions usually are when given of things with which we are already well acquainted. There are few that have not had opportunities of seeing them, and whose ideas would not anticipate our description. But, though nothing be so easy as to distinguish these in general from each other, yet the largest of the duck kind approach the goose so nearly, that it may be proper to mark the distinctions.

The marks of the goose are, a bigger body, large wings, a longer neck, a white ring above the rump, a bill thicker at the base, slenderer towards the tip, with shorter legs placed more forward on the body. They both have a waddling walk ; but the duck from the position of its legs, has it in a greater degree.

* This is the largest of the Auk kind, weighing about 4 pounds.

By these marks, these similar tribes may be known asunder ; and though the duck should be found to equal the goose in size, which sometimes happens, yet there are still other sufficient distinctions.

But they all agree in many particulars ; and have a nearer affinity to each other than the neighbouring kinds in any other department. Their having been tamed has produced alterations in each, by which they differ as much from the wild ones of their respective kinds, as they do among themselves. There is nearly as much difference between the wild and the tame duck, as between some sorts of the duck and the goose ; but still the characteristics of the kind are strongly marked and obvious ; and this tribe can never be mistaken.

The bill is the first great obvious distinction of the goose kind from all of the feathered tribe. In other birds, it is round and wedge-like, or crooked at the end. In all the goose-kind it is flat and broad, made for the purpose of skinning ponds and lakes of the mantling weeds that stand on the surface. The bills of other birds are made of a horny substance throughout ; these have their inoffensive bills sheathed with a skin which covers them all over. The bill of every other bird seems, in some measure, formed for piercing or tearing ; theirs are only fitted for shovelling up their food, which is chiefly of the vegetable kind.

Though these birds do not reject animal food when offered them, yet they can contentedly subsist upon vegetables, and seldom seek any other. They are easily provided for ; wherever there is water, there seems to be plenty. All the other web-footed tribes are continually voracious, continually preying. These lead more harmless lives : the weeds on the surface of the water, or the insects at the bottom, the grass by the bank, or the fruits and corn in cultivated grounds, are sufficient to satisfy their easy appetites ; yet these, like every other animal, will not reject flesh, if properly prepared for them ; it is sufficient praise to them that they do not eagerly pursue it.

As their food is chiefly vegetables, so their fecundity is in proportion. We have had frequent opportunities to observe, that all the predatory tribes, whether of birds or quadrupeds, are barren and unfruitful. We have seen the lion with its two cubs ; the eagle with the same number ; and the penguin with

even but one. Nature that has supplied them with powers of destruction, has denied them fertility. But it is otherwise with these harmless animals I am describing. They seem formed to fill up the chasms in animated nature, caused by the voraciousness of others. They breed in great abundance, and lead their young to the pool the instant they are excluded.

As their food is simple, so their flesh is nourishing and wholesome. The swan was considered as a high delicacy among the ancients; the goose was abstained from as totally indigestible. Modern manners have inverted tastes; the goose is now become the favourite; and the swan is seldom brought to table, unless for the purposes of ostentation. But at all times the flesh of the duck was in high esteem; the ancients thought even more highly of it than we do. We are contented to eat it as a delicacy; they also considered it as a medicine; and Plutarch assures us, that Cato kept his whole family in health, by feeding them with duck whenever they threatened to be out of order.

These qualities, of great fecundity, easy sustenance, and wholesome nourishment, have been found so considerable as to induce man to take these birds from a state of nature, and render them domestic. How long they have been thus dependents upon his pleasures is not known; for, from the earliest accounts, they were considered as familiars about him. The time must have been very remote; for there have been many changes wrought in their colours, their figures, and even their internal parts, by human cultivation. The different kinds of these birds, in a wild state, are simple in their colourings; when one has seen a wild goose or a wild duck, a description of its plumage will, to a feather, exactly correspond with that of any other. But in the tame kinds, no two of any species are exactly alike. Different in their size, their colours, and frequently in their general form, they seem the mere creatures of art; and having been so long dependent upon man for support, they seem to assume forms entirely suited to his pleasures or necessities.

CHAP. X.

OF THE SWAN, TAME AND WILD.*

No bird makes a more indifferent figure upon land, or a more beautiful one in the water, than the swan. When it

* Of the characters by which the swans are distinguished from the rest of the family, the most remarkable are the extreme length of their necks; the oval shape of their nostrils, which are placed about the middle of their bill; the nakedness of their cheeks; the equal breadth of their bills throughout; the great depth of that organ at the base, where the vertical considerably exceeds the transverse diameter; and the position of their legs behind the centre of gravity. They are by far the largest species of the family; and there are very few birds that exceed them in magnitude. They live almost constantly upon the water, preferring the larger streams and open lakes; and feed chiefly upon aquatic plants, the roots of which they are enabled to reach by means of their long necks, for they rarely if ever plunge the whole of their bodies beneath the surface. They also devour frogs and insects, and occasionally, it is said, even fishes; but this last assertion is contradicted by almost every observer who has attended particularly to their habits, and seems quite at variance with the fact that the fish-ponds to which they are sometimes confined do not appear to suffer the smallest diminution in the number of their inhabitants from the presence of these inoffensive birds. In their habits they are as peaceable as they are majestic in form, elegant in attitude, graceful in their motions, and, in the two species that are most commonly known to us, unsullied in the purity of their white and glossy plumage.

Of these species that which is known, improperly with reference to a large proportion of the individuals that compose it, as the tame swan, is probably the most common, being found in a state of domestication throughout the greater part of the northern hemisphere. In a wild state it is met with in almost every country of Europe, especially towards the east, and is particularly abundant in Siberia. Its distinguishing characters are found chiefly in its bill, which is throughout of an orange red, with the exception of the edges of the mandibles, the slight hook at the extremity, the nostrils, and the naked spaces extending from the base towards the eyes, all of which are black. A large protuberance, also of a deep black, surmounts the base of the bill; the iris is brown; and the legs black, with a tinge of red. All the plumage, without exception, in the adult bird, is of the purest white. In length the full grown male measures upwards of five feet, and more than eight in the expanse of its wings, which reach, when closed, along two-thirds of the tail. Its weight is usually about twenty pounds, but it sometimes attains five and twenty or even thirty; and those which inhabit the southern coast of the Caspian are said to reach a still more enormous size. The female is rather smaller than the male; her bill is surmounted by a smaller protuberance; and her neck is somewhat more slender. When first hatched the young are of a dusky gray, with lead-coloured bill and legs; in

ascends from its favourite element, its motions are awkward, and its neck is stretched forward with an air of stupidity; but when it is seen smoothly sailing along the water, commanding a thousand graceful attitudes, moving at pleasure without the smallest

the second year their plumage becomes lighter, and their bill and legs assume a yellowish tinge; in the third year they put on the adult plumage and colouring of the naked parts.

The wild birds of this species, like most of the waterfowl, are migratory in their habits. In the temperate regions of Europe they begin to absent themselves in October, and return towards the end of March to the quarters which they occupied in the preceding year. But when the winter is not particularly severe, they frequently remain through it, seeking for shelter among the dams and sluices of the rivers, and returning to their former quarters at the breaking of the frost. The females choose for their nestling-place the least frequented situations on the banks of the rivers or lakes which they inhabit, and build their nests in the rudest manner of twigs and reeds, lined with a comfortable coating of their breast feathers. They lay six or eight grayish eggs, and sit for five weeks, generally in April and May.

Although naturally one of the most gentle and inoffensive of birds, the large size and great muscular power of the swan render it a formidable enemy when driven to extremity, and compelled to act on the defensive. In such a case it is said to give battle to the eagle, and frequently even to repel his attack, forcing him to seek his safety in flight. It never attempts to molest any of the smaller waterfowl that inhabit its domains; but in the season of its amours it will not suffer a rival to approach its retreat without a sanguinary struggle, in which one or other is generally destroyed. It is said to attain a very great age, thirty years being commonly spoken of as the term of its existence. It is even asserted that in Alkmar, a town in the north of Holland, there died, in the year 1672, a swan belonging to the municipality, which bore on its collar the date 1573, and must consequently have been a century old; and several other instances of a similar nature have been related by authors. We must confess, however, that we entertain strong doubts of the authenticity of such statements, founded merely or popular tradition and unsupported by any positive evidence.

The *Wild Swan*, or, as it is not unfrequently termed, the Hooper, is a native of nearly the whole northern hemisphere. In the Old World it passes northwards as far as Iceland and Kamschatka, skirting the borders of the Arctic Circle, but rarely entering within its limits. Those which inhabit Europe generally pass the winter in its more southern regions, and even extend their flight to Egypt and Barbary; while the Asiatic birds seem rarely to pass much farther south than the shores of the Caspian and Black Seas. In America the range of their migrations is bounded by Hudson's Bay on the north, and Louisiana and the Carolinas on the south. They are extremely abundant in the northern parts of the New Continent and in Siberia; and in many districts of Russia they take the place of that which is improperly termed the Tame species, submitting themselves with equal readiness to the process of domestication.

The external differences between these two swans are not at first sight

effort; "when it proudly rows in state," as Milton has it, "with arched neck, between its white wings mantling," there is not a more beautiful figure in all nature. In the exhibition of its form, there are no broken or harsh lines, no constrained or

very obvious; but, trivial as they appear, they are uniform and constant. The bill of the present species is entirely destitute of protuberance at its base, and its colours are in a great degree reversed, the black occupying the point and nearly the whole of the bill, its base alone and the spaces extending from it beneath the eyes being of a bright yellow. The legs are black or dusky; the iris brown; and the entire plumage, as in the other species, pure white, but with an occasional tinge of yellowish gray. The young pass through similar gradations of colour with those of the tame swan, and arrive, like them, at their perfect plumage about the third or fourth year.

Slight as are these outward differences, they are fully sufficient for the detection of the species; and the separation founded upon them receives ample confirmation from anatomical characters of the highest importance. Not to speak of the difference in the number of their ribs, which are twelve in the wild Swan, and eleven only in the tame, their tracheæ or windpipes afford unquestionable evidence of their distinctness. Ray was the first to point out this marked distinction between the two birds, which had previously been regarded as doubtful species. It was neglected, however, by later naturalists, and even Buffon and Linnæus were inclined to consider them as mere varieties; but in these days, when the importance of anatomical characters is fully recognised, they are universally allowed to be distinct.

A third species, lately described by Mr Yarrell, is equally distinct from the hooper and the tame swan, although inhabiting the same localities as the former, and apparently by no means of unfrequent occurrence. This bird, which had been entirely overlooked by all systematic ornithologists, is about one third less than the common wild swan; but its trachea, of smaller comparative calibre, passes still more deeply into the cavity of the sternum, at the extremity of which, quitting the keel, it takes a horizontal direction, and occupies the posterior flattened portion of the bone. The bronchi or subdivisions of the windpipe are less than half the length of the same parts in the common hooper. Outwardly the differences between the two birds are even less strongly marked than those which distinguish the wild and tame swans from each other; consisting principally in the deep orange colour of the base of the bill, which is confined to a more limited space than the yellow on the same part in the hooper, and does not advance upon the sides; and in the number of the quill-feathers of the tail, which are eighteen in the new species and twenty in the old. To this fine addition to our list of native birds Mr Yarrell has applied the name of Bewick's Swan, in commemoration of an artist whose labours have done so much to render the study of ornithology popular in this country.

In habits the Wild Swan bears a close resemblance to the Tame. It flies with so much rapidity, especially when sailing before the wind, that the difficulty of shooting it is extremely great. Hearne asserts that it is "frequently necessary to take a sight ten or twelve feet before their bills;" and adds that "in a brisk gale, they cannot fly at a less rate than a hundred

rithing motions; but the roundest contours, and the easiest transitions; the eye wanders over every part with insatiable pleasure, and every part takes a new grace with a new motion.

This fine bird has long been rendered domestic; and it is

miles an hour, but when flying across the wind or against it, they make but a slow progress, and are then a noble shot." They are much sought after in those countries where they are abundant, for their flesh, their quill-feathers, and their down. The former according to the author just quoted, "is excellent eating, and, when roasted, is equal in flavour to young heifer beef, and the cygnets are very delicate." It is possible that in this instance the keen appetite of the sportsman may have imparted a relish to his game which it did not intrinsically possess. In Europe it is little sought after, and although cygnets are occasionally served upon the tables of the great, the rarity of the dish may be supposed to add not a little to its actual flavour, which to the taste of beef joins somewhat of that which is common to ducks and most of our waterfowl.

The Wild Swans arrive in Hudson's Bay as early as March, preceding all the other species of waterfowl. While the rivers remain frozen, they frequent the falls and rapids, where they are often shot by the Indians in large numbers. They are also pursued by the natives in the moulting time, which takes place in July and August; but it is extremely difficult to catch them, as they run with great swiftness on the surface of the water. In Iceland and Kamtschatka they are hunted at this time with dogs and horses, and frequently distance the latter, but are eventually pulled down by the dogs, which seize them by the neck and overbalance them. The female usually builds her nest on an island in the centre of a lake, and lays from five to seven eggs, "so big," says Hearne, "that one of them is sufficient for a moderate man, without bread or any other addition." They are of a dirty white with a shade of olive green. As in the Tame species, the battles between the males are frequent and obstinately contested, sometimes lasting for a whole day, and not uncommonly terminating in the death of one or other of the combatants.

The Black Swan.—When the classical writers of antiquity spoke of the Black Swan as a proverbial rarity, so improbable as almost to be deemed impossible, little did they imagine that in these latter days a region would be discovered, nearly equal in extent to the Roman empire even at the proudest period of its greatness, in which their "rara avis" would be found in as great abundance as the common Wild Swan upon the lakes of Europe. Such, however, has been one of the least singular among the many strange and unexpected results of the discovery of the great southern continent of New Holland. Scarcely a traveller who has visited its shores omits to mention this remarkable bird. An early notice of its transmission to Europe occurs in a letter from Witsen to Dr Martin Lister, printed in the twentieth volume of the Philosophical Transactions; and Valentyn published in 1726 an account of two living specimens brought to Batavia.

Since this period many living individuals have been brought to England, where they thrive equally well with the Emus, the Kangaroos, and other Australian animals, insomuch that they can now scarcely be regarded as rarities even in this country. They are precisely similar in form, and some-

now a doubt whether there be any of the tame kind in a state of nature. The wild swan, though so strongly resembling this in colour and form, is yet a different bird ; for it is very differently formed within. The wild swan is less than the tame by almost a fourth ; for as the one weighs twenty pounds, the other only weighs sixteen pounds and three quarters. The colour of the tame swan is all over white ; that of the wild bird is, along the back and the tips of the wings, of an ash-colour. But these are slight differences compared to what are found upon dissection. In the tame swan, the windpipe sinks down into the lungs in the ordinary manner ; but in the wild, after a strange and wonderful contortion, like what we have seen in the crane, it enters through a hole formed in the breast-bone ; and being reflected therein, returns by the same aperture ; and being contracted into a narrow compass by a broad and bony cartilage, it is divided into two branches, which, before they enter the lungs, are dilated, and, as it were, swollen out into two cavities.

Such is the extraordinary difference between these two animals, which externally seem to be of one species. Whether it is in the power of long-continued captivity and domestication to produce this strange variety, between birds otherwise the same, I will not take upon me to determine. But certain it is, that our tame swan is no where to be found, at least in Europe, in a state of nature.

As it is not easy to account for this difference of conformation, so it is still more difficult to reconcile the accounts of the

what inferior in size to the Wild and Tame Swans of the Old World ; but are perfectly black in every part of their plumage, with the exception of the primary and a few of the secondary quill-feathers, which are white. Their bill is of a bright red above, and is surmounted at the base in the male by a slight protuberance, which is wanting in the female. Towards its anterior part it is crossed by a whitish band. The under part of the bill is of a grayish white ; and the legs and feet are of a dull ash-colour. In every other respect, except in the mode of convolution of its trachea, this bird so perfectly corresponds with its well known congeners, that it is only necessary to refer to the articles in which we shall hereafter describe those beautiful species for an account of the characters which are common to them all. The Black Swans are found as well in Van Diemen's Land as in New South Wales and on the western coast of New Holland. They are generally seen in flocks of eight or nine together, floating on a lake ; and when disturbed, flying off like wild geese in a direct line one after the other. They are said to be extremely shy, so as to render it difficult to approach within gunshot of them.

ancients with the experience of the moderns, concerning the vocal powers of this bird. The tame swan is one of the most silent of all birds ; and the wild one has a note extremely loud and disagreeable. It is probable, the convolutions of the wind-pipe may contribute to increase the clangour of it ; for such is the harshness of its voice, that the bird from thence has been called the hooper. In neither is there the smallest degree of melody ; nor have they, for above this century, been said to give specimens of the smallest musical abilities ; yet, notwithstanding this, it was the general opinion of antiquity, that the swan was the most melodious bird ; and that even to its death, its voice went on improving. It would show no learning to produce what they have said upon the music of the swan : it has already been collected by Aldrovandus ; and still more professedly by the Abbe Gedoyn, in the Transactions of the Academy of Belles Lettres. From these accounts, it appears that, while Plato, Aristotle, and Diodorus Siculus, believed the vocality of the swan, Pliny and Virgil seem to doubt that received opinion. In this equipoise of authority Aldrovandus seems to have determined in favour of the Greek philosophers ; and the form of the windpipe in the wild swan, so much resembling a musical instrument, inclined his belief still more strongly. In aid of this also, came the testimony of Pendasius, who affirmed, that he had often heard swans sweetly singing in the lake of Mantua, as he was rowed up and down in a boat ; as also of Olaus Wormius, who professed that many of his friends and scholars had heard them singing. " There was," says he, " in my family, a very honest young man, John Rostorph, a student in divinity, and a Norwegian by nation. This man did, upon his credit, and with the interposition of an oath, solemnly affirm, that once in the territory of Dronten, as he was standing on the sea-shore, early in the morning, he heard an unusual and sweet murmur, composed of the most pleasant whistlings and sounds ; he knew not at first whence they came, or how they were made, for he saw no man near to produce them ; but looking round about him, and climbing to the top of a certain promontory, he there espied an infinite number of swans gathered together in a bay, and making the most delightful harmony ; a sweeter in all his life-time he had never heard." These were accounts sufficient at least to keep opinion in suspense, though in contradiction to our own experi-

ence : but Aldrovandus, to put, as he supposed, the question past all doubt, gives us the testimony of a countryman of our own, from whom he had the relation. This honest man's name was Mr Geo. Braun, who assured him, that nothing was more common in England than to hear swans sing ; that they were bred in great numbers in the sea near London ; and that every fleet of ships that returned from their voyages from distant countries, were met by swans, that came joyfully out to welcome their return, and salute them with a loud and cheerful singing ! It was in this manner that Aldrovandus, that great and good man, was frequently imposed upon by the designing and the needy : his unbounded curiosity drew round him people of every kind, and his generosity was as ready to reward falsehood as truth.— Poor Aldrovandus ! after having spent a vast fortune for the purposes of enlightening mankind ; after having collected more truth, and more falsehood, than any man ever did before him, he little thought of being reduced at last to want bread, to feel the ingratitude of his country, and to die a beggar in a public hospital :

Thus it appears that our modern authorities, in favour of the singing of swans, are rather suspicious, since they are reduced to this Mr G. Braun, and John Rostorph, the native of a country remarkable for ignorance and credulity. It is probable the ancients had some mythological meaning in ascribing melody to the swan ; and as for the moderns, they scarcely deserve our regard. The swan, therefore, must be content with that share of fame which it possesses on the score of its beauty ; since the melody of its voice, without better testimony, will scarcely be admitted by even the credulous.

This beautiful bird is as delicate in its appetites, as elegant in its form. Its chief food is corn, bread, herbs growing in the water, and roots and seeds, which are found near the margin. It prepares a nest in some retired part of the bank, and chiefly where there is an islet in the stream. This is composed of water-plants, long grass, and sticks ; and the male and female assist in forming it with great assiduity. The swan lays seven or eight eggs, white, much larger than those of a goose, with a hard, and sometimes a tuberos, shell. It sits near two months before its young are excluded ; which are ash-coloured when they first leave the shell, and for some months after. It is not a lit-

tle dangerous to approach the old ones when their little family are feeding round them. Their fears as well as their pride, seem to take the alarm; and they have sometimes been known to give a blow with their pinion, that has broke a man's leg or arm.

It is not till they are a twelvemonth old that the young swans change their colour with their plumage. All the stages of this bird's approach to maturity are slow, and seem to mark its longevity. It is two months hatching; a year in growing to its proper size: and if, according to Pliny's observation, those animals that are longest in the womb are the longest lived, the swan is the longest in the shell of any bird we know, and is said to be remarkable for its longevity. Some say that it lives three hundred years; and Willoughby, who is in general diffident enough, seems to believe the report. A goose, as he justly observes, has been known to live a hundred; and the swan, from its superior size, and from its harder, firmer flesh, may naturally be supposed to live still longer.

Swans were formerly held in such great esteem, in England, that by an act of Edward the Fourth, none, except the son of the king, was permitted to keep a swan, unless possessed of five marks a year. By a subsequent act, the punishment for taking their eggs was imprisonment for a year and a day, and a fine at the king's will. At present, they are but little valued for the delicacy of their flesh; but many are still preserved for their beauty. We see multitudes on the Thames and Trent; but no where greater numbers than on the salt water inlet of the sea, near Abbotsbury, in Dorsetshire.

CHAP. XI.

OF THE GOOSE, AND ITS VARIETIES.

THE GOOSE, in its domestic state, exhibits a variety of colours. The wild goose always retains the same marks; the whole upper part is ash-coloured; the breast and belly are of a dirty white; the bill is narrow at the base, and at the tip it is black; the legs are of a saffron colour, and the claws black. These marks are seldom found in the tame; whose bill is en

tirely red, and whose legs are entirely brown. The wild goose is rather less than the tame; but both invariably retain a white ring round their tail, which shows that they are both descended from the same original.

The wild goose is supposed to breed in the northern parts of Europe; and, in the beginning of winter, to descend into more temperate regions. They are often seen flying at very great heights, in flocks from fifty to a hundred, and seldom resting by day. Their cry is frequently heard when they are at an imperceptible distance above us; and this seems bandied from one to the other, as among hounds in the pursuit. Whether this be the note of mutual encouragement, or the necessary consequence of respiration, is doubtful; but they seldom exert it when they alight in these journeys.*

* The flight of wild geese takes place without noise, and the order in which it is performed, presupposes no small degree of combination and intelligence. It is an arrangement the most favourable for each individual to follow in its place and preserve its proper rank, and for the entire flock to cut the air with the smallest degree of fatigue. They place themselves in two oblique lines, forming an angle, or in a single line when the troop is not very numerous. He who is at the head of the angle, cuts the air first, retires to the last rank to repose himself when fatigued, and the others take his place in their turns. There are certain points, so to speak, from which the grand armies of these birds divide, to spread themselves through different countries; such are Mount Taurus relatively to Asia Minor, and Mount Stella, where they repair in the after-season, and from whence they disperse through Europe. These secondary bands unite again, and form others, which to the number of four or five hundred, come sometimes in winter, and alight upon our fields, where they feed upon the corn and grass, scraping away the snow. Every evening after sunset, the wild geese repair to ponds and rivers, where they pass the night, that they may enjoy security. Their habits, in this respect, are very different from those of ducks, which go, during the night, to pasture in the fields, and do not return to the water, but when the geese quit it. It is only during not very severe winters, that the wild geese remain any time in temperate climates; for when the rivers are frozen, they advance more southward, whence they retire towards the end of March, to return to the north, and proceed into the most elevated latitudes, to Spitzbergen, Greenland, to the shores of the Frozen Ocean, and to Hudson's Bay,—where their fat and dung constitute a resource for the hardy inhabitants.

The geese have good sight, very fine hearing, and their vigilance is so great that they are never taken at fault. While they are eating, or sleeping, there is always a sentinel in the troop, who, with his neck stretched out, and head in the air, is ready to give the signal of danger. If we add to these signs of intelligence, and to the remarks already made on the arrangement of their order of flight, the signal proofs of attachment,

Upon their coming to the ground by day, they range themselves in a line, like cranes ; and seem rather to have descended for rest, than for other refreshment. When they have sat in this manner for an hour or two, I have heard one of them, with a loud long note, sound a kind of charge, to which the rest punctually attended, and they pursued their journey with renewed alacrity. Their flight is very regularly arranged ; they either go in a line abreast, or in two lines, joining in an angle in the middle. I doubt whether the form of their flight be thus arranged to cut the air with greater ease, as is commonly believed ; I am more apt to think it is to present a smaller mark to fowlers from below. A bullet might easily reach them if huddled together in a flock, and the same discharge might destroy several at once ; but, by their manner of flying, no shot from below can affect above one of them ; and from the height at which they fly this is not easy to be hit.

The barnacle differs, in some respects, from both these ; being less than either, with a black bill, much shorter than either of the preceding. It is scarcely necessary to combat the idle error of this bird's being bred from a shell sticking to ships' bottoms ; it is well known to be hatched from an egg in the ordinary manner, and to differ in very few particulars from all the rest of its kind.

The Brent Goose is still less than the former, and not bigger than a Muscovy duck, except that the body is longer. The head, neck, and upper part of the breast are black ; but about the middle of the neck, on each side, are two small spots or lines of white, which together appear like a ring.

These, and many other varieties,* are found in this kind,

which domestic geese have exhibited on many occasions, we shall perceive how little foundation there is for the popular opinion respecting their stupidity. This indeed, appears to have been formed merely on external characters ; on their walk, their stretched out neck, gaping mouth, and the sound of their voice, especially when they experience any terror. As these birds fly remarkably high, and do not alight but when they are over waters, there is considerable difficulty in shooting them ; and their extreme distrust renders for the most part all the stratagems employed by fowlers of no avail. Our common application of the proverb, "a wild-geese chase," sufficiently proves this, and ought to do away with the vulgar prejudice respecting their stupidity.

* *The Snow Goose.*—This bird is about the size of the common goose. The upper mandible of the bill is scarlet, and the lower one whitish. The

which agree in one common character of feeding upon vegetables, and being remarkable for their fecundity. Of these, however, the tame goose is the most fruitful.—Having less to fear from its enemies, leading a securer and a more plentiful life, its

general colour of the plumage is white, except the first ten quills of the wings, which are black, with white shafts. The young are of a blue colour, till they are a year old. The legs are red. These birds are very numerous about Hudson's Bay, where they are migratory, going further northward to breed. They are also found in the northern parts of the old continent. The snow geese have so little of the shyness of the other species, that they are taken in a ludicrous manner, about Jakut, and the other parts of Siberia which they frequent. The inhabitants place near the banks of the rivers a great net in a straight line, or else form a hovel of skins sewed together; this done, one of the company dresses himself in the skin of rein-deer, advances towards the flock of geese, and then turns back towards the net or hovel; and his companions go behind the flock, and, by making a noise, drive them forward. The simple birds mistake the man in white for their leader, and follow him within reach of the net, which is suddenly pulled down on them, and thus captures the whole. When he chooses to conduct them to the hovel, they follow in the same manner; he creeps in at the hole left for that purpose and out at another at the opposite side, which he closes up. The geese follow him through the first; and as soon as they are in, he passes round and secures every one of them.

The Swan Goose.—This species is more than a yard in length, and is of a size between the swan and the common goose. It is distinguished from others of the goose tribe by its upright and stately deportment, by having a large knob on the root of the upper mandible, and a skin almost bare of feathers, hanging down like a pouch, or a wattle under the throat; a white line or fillet is extended from the corner of the mouth over the front of the brow; the base of the bill is orange; irides reddish brown; a dark brown or black stripe runs down the hinder part of the neck, from the head to the back; the forepart of the neck and the breast are yellowish brown; the back and all the upper parts brownish gray, edged with a lighter colour; the sides and feathers which cover the thighs are clouded nearly of the same colours as the back, and edged with white; belly white; and legs orange. It is said these birds originally were found in Guinea only: now they are become pretty common, in a wild as well as a domesticated state, both in warm and in cold climates. They breed with the common goose, and their offspring are as prolific as those of any other kind. The female is smaller than the male.

The Canadian Goose.—The Canadian Goose is somewhat larger than our common domesticated breed. It is also slenderer in its make and especially in its neck, which consequently approaches more nearly to that of the swan. The entire length of the bird is about three feet, and the expanse of its wings rather more than five. The back and wing-coverts are of a dull brown, with a whitish tip to each of the feathers; the quill-feathers of the wings and tail black; the sides pale ashy brown; and the upper part of the head and neck black, with a broad patch of white spreading from the throat on either side over the lower part of the cheeks. By this latter character,

prolific powers increase in proportion to its ease; and though the wild goose seldom lays above eight eggs, the tame goose is often seen to lay above twenty. The female hatches her eggs with great assiduity; while the Gander visits her twice or thrice

which is extremely obvious, this species may at all times be readily distinguished. Its bill is black; its iris dark hazel; and its legs and feet grayish-black or lead-coloured. There is little or no distinction in plumage between the two sexes.

Although commonly known by the name of Canada Geese, these birds are by no means confined to that country, but extend their migrations from the lowest latitudes of the United States to the highest parallels that have yet been visited in the northern regions of America. Throughout the whole of this vast extent of territory they are familiarly known as the harbingers of spring when passing to the north, and the presage of approaching winter on their return. In the United States it is the popular belief that their journeys are bounded by the great chain of lakes, in the islands of which they are supposed to breed; but even on the shores of Hudson's Bay they are still found to be proceeding northwards, and they rarely nest further south than 60 deg. Captain Phipps mentions having seen wild geese at Spitzbergen, in more than 80 deg. of latitude; and Wilson deems it "highly probable that they extend their migrations under the very pole itself, amid the silent desolation of unknown countries, shut out since the creation from the prying eye of man by everlasting and insuperable bars of ice."

The passage of the geese to the north commences with the breaking up of the ice, their first appearance in Canada and on the shores of Hudson's Bay varying with the forwardness of the spring, from the middle of April to the latter end of May. Their flight is heavy and laborious, but moderately swift, in a straight line when their number is but few, but more frequently in two lines meeting in a point in front. The van is said to be always led by an old gander, in whose wake the others instinctively follow. But should his sagacity fail in discovering the land-marks by which they usually steer, as sometimes happens in foggy weather, the whole flock appear in the greatest distress, and fly about in an irregular manner, making a great clamour. In their flights they cross indiscriminately over land or water, differing in this respect from several other geese, which prefer making a circuit by water to traversing the land. They also pass far inland, instead of confining their course to the neighbourhood of the sea.

So important is the arrival of the geese to the inhabitants of these northern regions that the month in which they first make their appearance is termed by the Indians, as we are informed by Pennant, the Goose Moon. In fact not only the Indians, but the English settlers also, depend greatly upon these birds for their subsistence, and many thousands of them are annually killed, a large proportion of which are salted and barrelled for winter consumption. Many too that are killed on their return, after the commencement of the frost, are suffered to freeze, and are thus kept as fresh provision for several months. Others, either taken young or wounded, are frequently detained in captivity during the winter. They seldom breed in so low a latitude as Churchhill River; but Hearne states that he has occasionally met with their eggs in that neighbourhood. The females rarely lay more than four eggs,

a day, and sometimes drives her off to take her place, where he sits with great state and composure.

But beyond that of all animals is his pride when the young are excluded : he seems then to consider himself as a champion, not only obliged to defend his young, but also to keep off the suspicion of danger ; he pursues dogs and men that never attempt to molest him : and, though the most harmless thing alive, is then the most petulant and provoking. When, in this manner, he has pursued the calf or the mastiff, to whose contempt alone he is indebted for safety, he returns to his female and her brood in triumph, clapping his wings, screaming, and showing all the marks of conscious superiority. It is probable, however, these arts succeed in raising his importance among the tribe where they are displayed ; and it is probable there is not a more respectable animal on earth to a goose than a gander !

A young goose is generally reckoned very good eating ; yet the feathers of this bird still farther increase its value. I feel my obligations to this animal every word I write ; for, however deficient a man's head may be, his pen is nimble enough upon

but the whole number is generally hatched. They are said usually to select an island in preference to the mainland, for the performance of the maternal office in greater safety.

The Spur-winged Goose.—Another species of the same group, is the Gambo or Spur-winged Goose, a native of northern, and more particularly of western, Africa. This bird agrees with the Canadian Goose in some of those characters which connect the geese with the swans, but is much more robust in make and more anserine in general appearance. Its size and proportions are nearly those of the common goose ; its legs long and placed beneath the middle of the body ; and its neck of moderate length and proportionate thickness. At the base of the bill, which is broad and flat, it has a tubercle like that of the tame swan, increasing in size with the age of the individual ; and the bend of its wings is furnished with a large blunt spur, which appears to be occasionally doubled.

The spur-winged goose was confounded by Willoughby, and afterwards by Buffon, with a variety of the Egyptian goose, equally distinguished by the presence of a spur upon the wing, but differing considerably in the form of its bill, and in its colours. In the former the entire bill and the tubercle at its base are of a dull red ; the sides of the head are white ; the upper parts of the body black, with a metallic brilliancy ; a patch of white, mottled with black spots, occupies the base of each of the wings ; and the under parts are white, sometimes marked with indistinct zigzag lines of gray. The legs have an obscure tinge of red ; and the spurs of the wings are horn-coloured ; but the latter are visible only when the wings are expanded, being concealed at all other times beneath the plumage.

every occasion : it is happy indeed for us that it requires no great effort to put it in motion. But the feathers of this bird are still as valuable in another capacity, as they make the softest and the warmest beds to sleep on.

Of goose-feathers most of our beds in Europe are composed ; in the countries bordering on the Levant, and in all Asia, the use of them is utterly unknown. They there use mattresses, stuffed with wool, or camel's hair, or cotton ; and the warmth of their climate may perhaps make them dispense with cushions of a softer kind. But how it happens that the ancients had not the use of feather-beds is to me surprising : Pliny tells us, indeed, that they made bolsters of feathers to lay their heads on ; and this serves as a proof that they turned feathers to no other uses.

As feathers are a very valuable commodity, great numbers of geese are kept tame in the fens in Lincolnshire, which are plucked once or twice a year. These make a considerable article of commerce. The feathers of Somersetshire are most in esteem ; those of Ireland are reckoned the worst. Hudson's Bay also furnishes very fine feathers, supposed to be of the goose kind. The down of the swan is brought from Dantzic. The same place also sends us great quantities of the feathers of the cock and hen ; but Greenland, Iceland, and Norway, furnish the best feathers of all : and in this number we may reckon the Eider down, of which we shall take notice in its place. The best method of curing feathers is to lay them in a room, in an open exposure to the sun ; and when dried, to put them into bags, and beat them well with poles to get the dust off. But, after all, nothing will prevent, for a time, the heavy smell which arises from the putrefaction of the oil contained in every feather ; no exposure will draw this off, how long so ever it be continued ; they must be lain upon, which is the only remedy ; and for this reason old feathers are much more valuable than new.

CHAP. XII.

OF THE DUCK, AND ITS VARIETIES.

THE Tame Duck is the most easily reared of all our domestic animals. The very instincts of the young ones direct them to their favourite element ; and though they are conducted by a hen, yet they despise the admonitions of their leader.

This serves as an incontestable proof that all birds have their manners rather from nature than education. A falcon pursues the partridge, not because it is taught by the old one, but because its appetites make their importunate call for animal food : the cuckoo follows a very different trade from that which its nurse endeavoured to teach it ; and, if we may credit Pliny, in time destroys its instructor : animals of the duck kind also follow their appetites, not their tutor, and come to all their various perfections without any guide. All the arts possessed by man are the result of accumulated experience ; all the arts of inferior animals are self-taught, and scarcely one acquired by imitation.

It is usual with the good women to lay duck-eggs under a hen, because she hatches them better than the original parent would have done. The duck seems to be a heedless inattentive mother ; she frequently leaves her eggs till they spoil, and even seems to forget that she is intrusted with the charge : she is equally regardless of them when excluded ; she leads them to the pond, and thinks she has sufficiently provided for her offspring when she has shown them the water. Whatever advantages may be procured by coming nearer the house, or attending in the yard, she declines them all ; and often lets the vermin, who haunt the waters, destroy them, rather than bring them to take shelter nearer home. The hen is a nurse of a very opposite character : she broods with the utmost assiduity, and generally brings forth a young one from every egg committed to her charge ; she does not lead her younglings to the water indeed, but she watchfully guards them when there, by standing at the brink. Should the rat, or the weasel, attempt to seize them, the hen can give them protection ; she leads them to the house when tired with paddling, and rears up the supposititious brood, without ever suspecting that they belong to another.

The wild duck differs, in many respects, from the tame ; and in them there is still greater variety than among the domestic kinds. Of the tame duck there are not less than ten different sorts ; and of the wild, Brisson reckons above twenty. The most obvious distinction between wild and tame ducks is in the colour of their feet : those of the tame duck being yellow, those of the wild duck black. The difference between wild ducks among each other, arises as well from their size as the nature of the place they feed in.* Sea-ducks, which feed in salt-water, and

* It is towards the middle of October that the wild ducks generally begin to make their appearance among us, but only in small bands, which are in a little time followed by others more numerous. They are recognised by their elevated flight, in inclined lines, or regular triangles. They are observed on their arrival to fly incessantly from one pond and river to others. Their movements are made more by night than by day. They feed, voyage, arrive, and depart principally in the evening, and even at night, during which the whizzing of their flight discovers their passage ; but the noise of their wings is greatest at the moment of their setting out. As long as the rigour of the season does not deprive them of aquatic insects, of small fish, of frogs, of the grains of seeds, and other marshy plants, which furnish them with abundant food, they remain in rivers and large pieces of stagnant water ; but when these are frozen, they retire to the borders of woods to pick up the acorns, or spread themselves in the fields to feed upon the green corn. If the cold continues, and becomes too rigorous, they depart altogether, and transport themselves into more temperate climates, returning only with the thaw about the month of February. It is usually in the evening that they are seen to repass with the winds from the south ; but the bands are less numerous, because at this epoch they commence to pair. Each couple set off separately, remain isolated in the reeds and rushes the greater part of the day, travel by night, never stop except when impeded by contrary winds, and proceed to the northern regions to pass the summer. Some few couples, however, remain with us, and nestle in marshy grounds. The female usually makes choice of a thick tuft of rushes, of the middle of which she forms a nest by cutting and bending the stems. Such nests are, however, sometimes found in the midst of brushwood at some distance from the water, and these birds have even been known to lay in the nests of others. The eggs are from ten to fifteen, and sometimes even eighteen in number, and of a greenish-white. The mother strips her breast to furnish the nest, and to cover the eggs during her absence. She never alights at less than a hundred paces from the nest, and takes a circuitous route to arrive there, with her eyes constantly watching to see if there are any enemies in the neighbourhood. Once fixed, however, on the eggs, even the approach of man will not oblige her to quit them. The male remains at some distance from his companion, ready to assist and defend her. The incubation lasts thirty days ; and as soon as the young are disclosed, the mother conducts them to the water ; it is even said, that if they are at some distance from it, the parents bring them there one by one with their bills. The female rallies them in the evening, conceals them in reeds, and covers them with her

dive much, have a broad bill, bending upwards, a large hind toe, and a long blunt tail. Pond-ducks, which feed in splashes, have a straight and narrow bill, a small hind-toe, and a sharp-pointed train. The former are called, by our decoy-men, *foreign ducks*; the latter are supposed to be natives of England. It would be tedious to enter into the minute varieties of such a number of birds; all agreeing in the same general figure, the same habits and mode of living, and differing in little more than their size and the colours of their plumage. In this tribe we may rank, as natives of our own European dominions, the Eider Duck, which is double the size of a common duck, with a black bill; the Velvet Duck, not so large, and with a yellow bill; the Scoter, with a knob at the base of a yellow bill; the Tufted Duck, adorned with a thick crest; the Scaup Duck, less than the common duck, with the bill of a grayish blue colour; the Golden Eye, with a large white spot at the corners of the mouth, resembling an eye; the Sheldrake, with the bill of a bright red, and swelling into a knob;* the Mallard, which is the stock from

wings during the night. The small insects, &c. which they can catch on the surface of the water are their first food. They are for some time covered with a yellowish down, and are unable to fly until they are three months old.

These birds are exceedingly distrustful, make many circumnutations before they alight anywhere, swim always at a distance from the shore; and when they sleep upon the water, which they often do, one of them always watches as a sentinel. In consequence of this, the pursuit of them is extremely difficult.

The wild ducks in general prefer the northern regions; but birds of such powerful flight can easily be supposed to pass from one continent to another. We find, in fact, this same species in corresponding climates in the New World; but the American species seems larger and more robust, though in all other respects exactly similar.

* We shall here notice more particularly a few of these varieties.

The Velvet Duck.—It is an inhabitant of Europe and South America, and is between twenty and twenty-two inches in length. The plumage is blackish; the lower eyelid and spot on the wings white; the bill is yellow, black in the middle, gibbous at the base; the legs are red. The female is without the gibbosity at the bill; her body is brown; and she lays white eggs.

The Scaup Duck.—Inhabits Europe, Northern Asia, and America: it migrates in winter to warmer climates; its food is shell-fish, and is in length from eighteen to twenty inches. The back and shoulders are cinereously waved; the belly is white; it has also a white spot on each wing. The bill is broad, and of a bluish ash-colour; the irides yellow; the head and neck are of a greenish black colour; the back and wing-coverts waved with black and cinereous; the legs and primary quill feathers are dusky; the second

whence our tame breed has probably been produced ; the Pintail, with the two middle feathers of the tail three inches longer than the rest ; the Pochard, with the head and neck of a bright bay ; the Widgeon, with a lead-coloured bill, and the plumage of the

ries are white, tipped with black ; the tail covert and the vent are black. The female birds are brown ; the bill black, surrounded with a circle of white feathers ; the neck rusty ; the belly is white ; and there is a bar of white on each wing ; the legs are black.

The Shieldrake.—This has a flat bill, a compressed fore-head, a greenish black head, and the body variegated with white. It is an inhabitant of the northern world as far as Iceland. They usually breed in deserted rabbit-holes, and lay fifteen or sixteen roundish white eggs ; and sit about thirty days. "They are very careful of their young," says Latham, "and will carry them from place to place in their bills." They also show much instinctive cunning in preserving them when attempted to be caught ; for they will fly along the ground as if wounded, till the brood are got into a place of security. Their great beauty has induced many unsuccessful attempts to domesticate them ; but they never thrive, unless in the neighbourhood of salt water. The eggs are thought good ; but the flesh of this bird is rank and unsavoury.

The Mallard—Is about the size of the preceding ; its bill, from the angles of the mouth to the tip, is about two inches and a quarter, and near an inch broad, with a roundish tip at the end ; the head and upper part of the neck are of a beautiful shining green ; the under eyelids white, with a sort of half circle or white ring that passes round the fore-part of the neck ; the under part of the neck below the white ring to the breast, is of a glossy chestnut colour. The under parts of the breast and belly are a sort of ash-colour, sprinkled with a variety of dark specks resembling drops ; the back between the wings is of a cinereous red, in like manner sprinkled or speckled ; the lower part towards the rump still darker ; the rump itself of a sort of glossy purple. The sides of the body and the longer thigh feathers are beautified with transverse brown lines, with a bluish sort of mixture. The scapular feathers of the wings are of a fine silver colour, beautifully variegated with brown transverse lines ; the second row of the quill feathers tipped with white, with the outward webs of a fine bluish purple, and a border of black running between the white and the blue ; the rest of the wings variegated with silver-coloured feathers, with some of their edges black, others of a dark purple. The under parts of the tail is black, the feathers on the upper end in sharp points, the middlemost of which turn up in a circular form towards the back, and appear of a fine glossy purple colour. They are feathered down to the knees ; the legs and feet are of a saffron colour.

Long-Tailed Duck.—The tail is pointed and long ; the body is black ; it is whitish beneath. It inhabits Europe, Asia, and America. The bill is black, orange-coloured in the middle ; it is reddish gray on the fore-part of the head and sides ; hind-part, breast, and belly, white ; the scapulars are long and white ; on each side of the neck it has a black spot ; the lower part of the breast, back, wings, and tail, are of a chocolate colour ; the four middle tail feathers are black ; the two middle ones longer than the rest ; the others are white ; the legs are dusky red, or blackish. The female has

back marked with narrow black and white undulated lines, but best known by its whistling sound; lastly, the Teal, which is the smallest of this kind, with the bill black, the head and upper part of the neck of a bright bay.—These are the most common birds of the duck kind among ourselves: but who can describe the amazing variety of this tribe if he extends his view to the different quarters of the world? The most noted of the foreign tribe are the Muscovy Duck, or, more properly speaking, the Musk Duck, so called from a supposed musky smell, with naked skin round the eyes, and which is a native of Africa; the Brazilian Duck, that is of the size of a goose, all over black except the tips of the wings; the American Wood Duck, with a variety of beautiful colours, and a plume of feathers that falls from the back of the head like a friar's cowl.—These, and twenty others, might be added, were increasing the number of names the way to enlarge the sphere of our comprehension.

All these live in the manner of our domestic ducks, keeping together in flocks in the winter, and flying in pairs in summer, bringing up their young by the water-side, and leading them to their food as soon as out of the shell. Their nests are usually built among heath or rushes, not far from the water, and they lay twelve, fourteen, or more eggs, before they sit: yet this is not always their method; the dangers they continually encounter from their ground situation, sometimes obliges them to change their manner of building; and their awkward nests are often seen exalted on the tops of trees. This must be a very great labour to perform, as the duck's bill is but ill formed for building a nest, and giving the materials of which it is composed a sufficient stability to stand the weather. The nest, whether

a shorter tail, and wedged; the body is varied with blackish, raffous and gray; the back is black; collar and lower part of the belly white.

The Golden Eye—Chiefly breeds in Italy: it has a large head and thick body; the neck short; and the bill broad, elevated towards the point, of a black colour, and is, if measured from the angles of the mouth, about an inch and three quarters long; the head, when variously exposed to the light, appears black, purple, and green, with a fine shining silky gloss; it has a white spot on each side of the mouth; the eyes are of a fine gold colour; the neck, breast, and belly, white; the space between the shoulders and the back is black; the wings of a fine beautiful mixture of black and white; the tail near three inches long; the legs short, of a yellowish colour; the toes pretty long, and more dusky. It has a disagreeable fishy taste; they are sometimes, but very rarely, taken upon the English coast.

high or low, is generally composed of singular materials. The longest grass mixed with heath, and lined with the bird's own feathers, usually go to the composition : however, in proportion as the climate is colder, the nest is more artificially made, and more warmly lined. In the Arctic regions, nothing can exceed the great care, all of this kind take, to protect their eggs from the intenseness of the weather. While the gull and the penguin kind seem to disregard the severest cold, the duck, in those regions, forms itself a hole to lay in, shelters the approach, lines it with a layer of long grass and clay ; within that another of moss ; and, lastly, a warm coat of feathers, or down. The eider duck is particularly remarkable for the warmth of its nest. This bird, which, as was said, is above twice as large as the common duck, and resides in the colder climates, lays from six to eight eggs, making her nest among the rocks or the plants along the sea-shore. The external materials of the nest are such as are in common with the rest of the kind ; but the inside lining, on which the eggs are immediately deposited, is at once the softest, warmest, and the lightest substance, with which we are acquainted. This is no other than the inside down which covers the breast of the bird in the breeding season. This the female plucks off with her bill, and furnishes the inside of her nest with a tapestry more valuable than the most skilful artists can produce. The natives watch the place where she begins to build, and, suffering her to lay, take away both the eggs and the nest. The duck, however, not discouraged by the first disappointment, builds and lays in the same place a second time ; and this they in the same manner take away : the third time she builds, but the drake must supply the down from his breast to line the nest with : and if this be robbed, they both forsake the place, and breed there no more. This down the natives take care to separate from the dirt and moss with which it is mixed ; and though no people stand in more need of a warm covering than themselves, yet their necessities compel them to sell it to the more indolent and luxurious inhabitants of the south for brandy and tobacco.*

* The Eiders have some analogy with the geese, but more with the duck. They live on fish or shell-fish.

The Eider duck is principally found in the western Islands of Scotland, and on the coasts of Norway, Iceland, and Greenland. Its bill is black, and

As they possess the faculties of flying and swimming, so they are in general birds of passage, and, it is most probable, perform their journeys across the ocean, as well on the water as in the air. Those that migrate to this country, on the approach of

Its plumage is a varied mixture of black and white ; the female however is of a reddish brown colour, marked with black and dusky streaks. They generally build on small islands, not far from the shore, and the male continues on the watch near the shore while the female is sitting ; but he leaves them when the brood is hatched. As soon as they are able to creep from the shell, the mother entices them to the water side, and taking them on her back, she swims a short distance with them ; when she has got them a little way from land, she dives suddenly, leaving them floating on the surface of the water to shift for themselves. After this they are seldom found on land.

But that which renders this bird so highly valued, is the celebrated Eider down, used for the beds and couches of the luxurious and the effeminate. This is plucked from the breast by the birds, in order to line their nests ; and during the time that the female is sitting, those who are concerned in the traffic, remove her, and take away the down and superfluous eggs, and then carefully replace her. This is done several times, and the down is again produced by the birds, and she begins to lay afresh ; and when the young ones leave the nest, it is completely plundered. One female will give about half a pound of down, which, when properly cleaned, is reduced to one half of that quantity. The down, when cleaned, sells at about 12s. per pound.

The example of the eider-duck, in plucking the down from her body in order to keep her offspring warm, is not unwatched in the animal world. The domestic rabbit is a familiar example, preparing for her delicate young a nest of hay, warmly lined with down plucked from her own fur. It may not be so generally known, that several moths, such as the gypsy and the golden tail, are provided with a thick bunch of down on their tails for covering their eggs at the time of laying, and also with a pair of tweezers, likewise situated in the tail, for plucking off this down and spreading it over the eggs.

It has been remarked by Aristotle, that birds which do not perch build on the ground :—"Partridges," he says, "and other birds which seldom fly, nestle on the ground ; of these, also, the skylark, the woodcock, and the quail never alight on a tree. But the converse of this will not hold ; for many birds which perch nestle on the ground, of which the redbreast, the buntings, and the pheasants, are familiar examples. A very remarkable illustration, however, of the remark of Aristotle, occurs in the summer-duck of America, which does not seem out of place to be mentioned here, as one of the birds which line their nests with their own down. At variance with the habits of all other ducks, this one perches on trees, for which its strong sharp claws render it more adapted than its webbed feet. The elegant form and rich colouring of the male (though the female wears a uniform of dull brown) have excited the admiration of all who have seen it ; and we think it not unlikely that the Indians took the hint of their plumed head-dresses from its beautiful crest. With this crest and the skin of the neck, the calumet, or pipe of peace, is frequently ornamented. Linnæus,

winter, are seldom found so well-tasted or so fat as the fowls that continue with us the year round : their flesh is often lean, and still oftener fishy ; which flavour it has probably contracted in the journey, as their food in the lakes of Lapland, from whence they descend, is generally of the insect kind.

As soon as they arrive among us, they are generally seen flying in flocks to make a survey of those lakes where they intend to take up their residence for the winter. In the choice of these they have two objects in view ; to be near their food, and yet remote from interruption. Their chief end is to choose

whose nomenclature exhibits some singular displays of fanciful allusion, imagined that this duck's crest so much resembled the bridal head-dress of his country-women, that he named it the bride, though the one is high, stiff, fantastic, and out of all reasonable proportion, while the other is free, elegant, and graceful. The beautiful pendent crest of the summer-duck arises from a base of glossy golden green, shading off into a rich violet brown, dashed with interrupted streaks of snow white. The feathers covering the wings are of the same glossy brown, which melts into black, with rich purple reflections of burnished steel ; while those on the flanks are delicately fringed and striped with black and white.

It is stated in the notes to Buffon, by the English translator, that the summer-duck nestles in the holes bored by the woodpeckers ; but this, on considering its size, must appear impossible. That it does, however, make its nest in the holes of trees has been testified by every observer. Wilson informs us that instances have been known in which the nest was constructed with a few sticks laid on the fork of the branches, though it is usually in the inside of a hollow tree, and, as it would appear, very near if not upon the ground. "On the 18th of May," continues Wilson, "I visited a tree containing a nest of a summer-duck, on the banks of Tuckahoe river, New Jersey. It was an old grotesque white oak, whose top had been torn off by a storm. It stood on the declivity of the bank, about twenty yards from the water. In this hollow and broken top, and about six feet down, on the soft decayed wood, lay thirteen eggs, snugly covered with down, doubtless taken from the breast of the bird. This tree had been occupied, probably by the same pair, for four successive years, in breeding-time. The person who gave me the information, and whose house was within twenty or thirty yards of the tree, said that he had seen the female, the preceding spring, carry down her young one by one in less than ten minutes. She caught them in her bill by the wing or back of the neck, and landed them safely at the foot of the tree, whence she afterwards led them to the water. Under this same tree, at the time I visited it, a large sloop lay on the stocks nearly finished ; the deck was not more than twelve feet distant from the nest, yet, notwithstanding the presence and noise of the workmen, the ducks would not abandon their old breeding-place, but continued to pass out and in as if no person had been near. The male usually perched on an adjoining limb, and kept watch while the female was laying, and also often while she was sitting. A tame goose had chosen a hollow space at the root of the same tree to lay and hatch her young in."

some lake in the neighbourhood of a marsh, where there is at the same time a cover of woods, and where insects are found in great abundance. Lakes, therefore, with a marsh on one side, and a wood on the other, are seldom without vast quantities of wild-fowl; and where a couple are seen at any time, that is a sufficient inducement to bring hundreds of others. The ducks flying in the air, are often lured down from their heights by the loud voice of the mallard from below. Nature seems to have furnished this bird with very particular faculties for calling. The windpipe, where it begins to enter the lungs, opens into a kind of bony cavity, where the sound is reflected as in a musical instrument, and is heard a great way off. To this call all the stragglers resort; and in a week or a fortnight's time, a lake, that before was quite naked, is black with waterfowl that have left their Lapland retreats, to keep company with our ducks who never stirred from home.

They generally choose that part of the lake where they are inaccessible to the approach of the fowler, in which they all appear huddled together, extremely busy, and very loud. What it is can employ them all the day it is not easy to guess. There is no food for them at the place where they sit and cabal thus, as they choose the middle of the lake; and as for courtship, the season for that is not yet come; so that it is wonderful what can so busily keep them occupied. Not one of them seems a moment at rest. Now pursuing one another, now screaming, then all up at once, then down again; the whole seems one strange scene of bustle, with nothing to do.

They frequently go off in a more private manner by night to feed in the adjacent meadows and ditches, which they dare not venture to approach by day. In these nocturnal adventures they are often taken; for though a timorous bird, yet they are easily deceived, and every spring seems to succeed in taking them. But the greatest quantities are taken in decoys; which, though well known near London, are yet untried in the remoter parts of the country. The manner of making and managing a decoy is as follows:—

A place is to be chosen for this purpose far remote from the common highway, and all noise of people. A decoy is best where there is a large pond surrounded by a wood, and beyond that a marshy and uncultivated country. When the place is

chosen, the pool, if possible, is to be planted round with willows, unless a wood answers the purpose of shading it on every side. On the south and north side of this pool are two, three, or four ditches or channels, made broad towards the pool, and growing narrower till they end in a point. These channels are to be covered over with nets, supported by hooped sticks bending from one side to the other; so that they form a vault or arch growing narrower and narrower to the point, where it is terminated by a tunnel-net, like that in which fish are caught in weirs. Along the banks of these channels so netted over, which are called pipes, many hedges are made of reeds slanting to the edge of the channel, the acute angles to the side next the pool. The whole apparatus, also, is to be hidden from the pool by a hedge of reeds along the margin, behind which the fowler manages his operations. The place being fitted in this manner, the fowler is to provide himself with a number of wild ducks made tame, which are called decoys. These are always to be fed at the mouth or entrance of the pipe, and to be accustomed to come at a whistle.

As soon as the evening is set in, *the decoy rises*, as they term it, and the wild-fowl feed during the night. If the evening be still, the noise of their wings, during their flight, is heard at a very great distance, and produces no displeasing sensation. The fowler, when he finds a fit opportunity, and sees his decoy covered with fowl, walks about the pool, and observes into what pipe the birds gathered in the pool may be enticed or driven. Then casting hemp-seed, or some such seed as will float on the surface of the water, at the entrance, and up along the pipe, he whistles to his decoy-ducks, who instantly obey the summons, and come to the entrance of the pipe, in hopes of being fed as usual. Thither also they are followed by a whole flock of wild ones, who little suspect the danger preparing against them. Their sense of smelling, however, is very exquisite; and they would soon discover their enemy, but that the fowler always keeps a piece of turf burning at his nose, against which he breathes, and this prevents the effluvia of his person from reaching their exquisite senses. The wild ducks, therefore, pursuing the decoy-ducks, are led into the broad mouth of the channel or pipe, nor have the least suspicion of the man, who keeps hidden behind one of the hedges. When they have got up the pipe, however, finding it grow more and more narrow, they begin to

suspect danger, and would return back ; but they are now prevented by the man, who shows himself at the broad end below. Thither, therefore, they dare not return ; and rise they may not, as they are kept by the net above from ascending. The only way left them, therefore, is the narrow-funnelled net at the bottom ; into this they fly, and there they are taken.

It often happens, however, that the wild fowl are in such a state of sleepiness or dozing, that they will not follow the decoy-ducks. Use is then generally made of a dog, who is taught his lesson. He passes backward and forward between the reed-hedges, in which there are little holes, both for the decoy-man to see, and for the little dog to pass through. This attracts the eye of the wild-fowl ; who, prompted by curiosity, advance toward this little animal, while he all the time keeps playing among the reeds, nearer and nearer the funnel, till they follow him too far to recede. Sometimes the dog will not attract their attention till a red handkerchief, or something very singular, be put about him. The decoy-ducks never enter the funnel-net with the rest, being taught to dive under water as soon as the rest are driven in.

The general season for catching fowl in decoys is from the latter end of October till February. The taking them earlier is prohibited by an act of George the Second, which imposes a penalty of five shillings for every bird destroyed at any other season.

The Lincolnshire decoys are commonly let at a certain annual rent, from five pounds to twenty pounds a year ; and some even amount to thirty. These principally contribute to supply the markets of London with wild-fowl. The number of ducks, widgeon, and teal, that are sent thither is amazing. Above thirty thousand have been sent up in one season from ten decoys in the neighbourhood of Wainfleet. This quantity makes them so cheap on the spot, that it is asserted, that several decoy-men would be glad to contract for years to deliver their ducks at the next town for ten pence the couple.

To this manner of taking the wild-fowl in England, I will subjoin another, still more extraordinary, frequently practised in China. Whenever the fowler sees a number of ducks settled in any particular plash of water, he sends off two or three gourds to float among them. These gourds resemble our pompions ;

but, being made hollow, they swim on the surface of the water ; and on one pool there may sometimes be seen twenty or thirty of these gourds floating together. The fowl at first are a little shy of coming near them ; but by degrees they come nearer ; and as all birds at last grow familiar with a scare-crow, the ducks gather about these, and amuse themselves by whetting their bills against them. When the birds are as familiar with the gourds as the fowler could wish, he then prepares to deceive them in good earnest. He hollows out one of these gourds large enough to put his head in ; and making holes to breathe and see through, he claps it on his head. Thus accoutred, he wades slowly into the water, keeping his body under, and nothing but his head in the gourd above the surface ; and in that manner moves imperceptibly towards the fowls, who suspect no danger. At last, however, he fairly gets in among them ; while they, having been long used to see gourds, take not the least fright while the enemy is in the very midst of them : and an insidious enemy he is ; for ever as he approaches a fowl, he seizes it by the legs, and draws it in a jerk under water. There he fastens it under his girdle, and goes to the next, till he has thus loaded himself with as many as he can carry away. When he has got his quantity, without ever attempting to disturb the rest of the fowls on the pool, he slowly moves off again ; and in this manner pays the flock three or four visits in a day. Of all the various artifices for catching fowl, this seems likely to be attended with the greatest success, as it is the most practised in China.

CHAP. XIII.

OF THE KING-FISHER.*

I WILL conclude this history of birds with one that seems to unite in itself somewhat of every class preceding. It seems at once possessed of appetites for prey like the rapacious kinds, with an attachment to water like the birds of that element. It

* There are no less than forty-two species of kingfishers, and of some of these several varieties ; and all of them have the most beautiful and variegated plumage.

exhibits in its form the beautiful plumage of the peacock, the shadings of the humming-bird, the bill of the crane, and the short legs of the swallow. The bird I mean is the King-fisher, of which many extraordinary falsehoods have been propagated ; and yet of which many extraordinary things remain to be said that are actually true.

The King-fisher is not much larger than a swallow ; its shape is clumsy ; the legs disproportionably small, and the bill disproportionably long : it is two inches from the base to the tip ; the upper chap black, and the lower yellow : but the colours of this bird atone for its inelegant form ; the crown of the head and the coverts of the wings are of a deep blackish green, spotted with bright azure ; the back and tail are of the most resplendent azure ; the whole under-side of the body is orange-coloured ; a broad mark of the same passes from the bill beyond the eyes ; beyond that is a large white spot ; the tail is short, and consists of twelve feathers of a rich deep blue ; the feet are of a reddish yellow, and the three joints of the outmost toe adhere to the middle toe, while the inner toe adheres only by one.

From the diminutive size, the slender short legs, and the beautiful colours of this bird, no person would be led to suppose it one of the most rapacious little animals that skims the deep. Yet it is for ever on the wing, and feeds on fish, which it takes in surprising quantities, when we consider its size and figure. It chiefly frequents the banks of rivers, and takes its prey after the manner of the osprey, balancing itself at a certain distance above the water for a considerable space, then darting into the deep, and seizing the fish with inevitable certainty. While it remains suspended in the air, in a bright day, the plumage exhibits a beautiful variety of the most dazzling and brilliant colours. It might have been this extraordinary beauty that has given rise to fable ; for whenever there is any thing uncommon, fancy is always willing to increase the wonder.*

* Montague, in his Ornithological Dictionary, says, that they never suspend themselves on the wing, and dart on their prey, like the osprey ; but that they sit patiently on a bough over the water, and when a small fish comes near the surface, they dart on it, and seize it with their bill. He never could observe the old birds with any thing in their bills, when they went in to feed their young : from which he concludes that they eject it from their stomachs for this purpose.

Of this bird it has been said, that she built her nest on the water, and thus, in a few days, hatched and produced her young. But, to be uninterrupted in this task, she was said to be possessed of a charm to allay the fury of the waves ; and during this period the mariner might sail with the greatest security. The ancient poets are full of these fables ; their historians are not exempt from them. Cicero has written a long poem in praise of the halcyon, of which there remain but two lines. Even the emperor Gordian has written a poem on this subject, of which we have nothing remaining. These fables have been adopted each by one of the earliest fathers of the church. " Behold," says St Ambrose, " the little bird, which in the midst of winter lays her eggs on the sand by the shore. From that moment the winds are hushed ; the sea becomes smooth ; and the calm continues for fourteen days. This is the time she requires ; seven days to hatch, and seven days to foster her young. Their Creator has taught these little animals to make their nest in the midst of the most stormy season, only to manifest his kindness by granting them a lasting calm. The seamen are not ignorant of this blessing ; they call this interval of fair weather their *halcyon days* ; and they are particularly careful to seize the opportunity, as they then need fear no interruption." This, and a hundred other instances, might be given of the credulity of mankind with respect to this bird ; they entered into speculations concerning the manner of her calming the deep, the formation of her nest, and her peculiar sagacity ; at present we do not speculate because we know, with respect to our king-fisher, that most of the facts are false. It may be alleged, indeed, with some show of reason, that the halcyon of the ancients was a different bird from our king-fisher ; it may be urged, that many birds, especially on the Indian ocean, build a floating nest upon the sea ; but still the history of the ancient halcyon is clogged with endless fable ; and it is but an indifferent method to vindicate falsehood, by showing that a part of the story is true.*

* Every schoolboy is acquainted with the story in Ovid's *Metamorphoses*, of Ceyx, king of Magnesia, being shipwrecked, and of his queen, Alcyone (fabled to be the daughter of the wind,) who flung herself from a cliff overhanging the sea, that she might be drowned as well as her husband ;—but, instead of perishing, both were changed into kingfishers : as Dryden gives it,

" The gods their shape to winter birds translate,
But both obnoxious to their former fate.

The kingfisher with which we are acquainted at present, has none of those powers of allaying the storm, or building upon the waves; it is contented to make its nest on the banks of rivers in such situations as not to be affected by the rising of the

Their conjugal affection first is tried,
And still the mournful race is multiplied."

The description of this bird by Aristotle is both luminous and accurate. "The halcyon," says he, "is not much larger than a sparrow; its plumage is painted with azure and green, slightly tinged with purple,—these colours not being distinct, but blending into one another; and shining in an iridescent manner over the whole body, the wings, and the neck; the bill is greenish yellow (*ὕποχλωρος*), long and slender." Pliny has in part followed Aristotle, but has introduced more details of the notions prevalent respecting the bird among the ancients.

With respect to the vocal powers of any species of halcyon, it is probable that Pliny, and those he copied from, confounded it with the sedge bird, with the dipper, or some other water songster, whose manner it is to sing concealed; while the halcyon, perched on some leafless twig overhanging the water, being easily perceived, acquired credit for what she was incapable of performing. It was supposed, by Belon, and perhaps correctly, that the musical halcyon was the river nightingale, or reed thrush, which is reported to be a pertinacious songster, and creeps about amongst water-plants in pursuit of insects; but Belon is wrong in supposing it the only river bird which sings.

Wilson's description of the belted kingfisher, though differing in a few points from the common halcyon of Europe, comes much nearer the reality than the fables of the old poets and naturalists. "Like the love-lorn swains," says he, "of whom poets tell us, he delights in murmuring streams and falling waters; not, however, merely that they may soothe his ear, but for a gratification somewhat more substantial. Amidst the roar of the cataract or over the foam of a torrent, he sits perched upon an overhanging bough, glancing his piercing eye in every direction below for his scaly prey, which with a sudden circular plunge he sweeps up from their native element and swallows in an instant. His voice, which is not unlike the twirling of a watchman's rattle, is naturally loud, harsh, and sudden; but is softened by the sound of the brawling streams and cascades among which he generally rambles. He courses along the windings of the brook or river, at a small height above the surface, sometimes suspending himself by the rapid action of his wings like certain species of hawks, ready to pounce on the fry below; now and then settling on an old dead overhanging limb to reconnoitre. Mill-dams are particularly visited by this feathered fisher; and the sound of his pipe is as well known to the miller, as the rattling of his own hopper."

It is easy to be perceived how the kingfisher might be mistaken for a bird of song. But the fancy of the halcyon's ruling the weather after the manner assumed by the philosopher in the tale of Rasselas is so extravagant, that we cannot but smile at Montaigne, who seriously believes that "nature has honoured no other animal so much during its sitting and disclo-

stream. When it has found a place for its purpose, it hollows out with its bill a hole about a yard deep ; or if it finds the deserted hole of a rat, or one caused by the root of a tree decaying, it takes quiet possession. This hole it enlarges at the

ing, for that the whole ocean is stayed, made stable and smoothed without waves, without winds or rain, whilst the halcyon broods upon her young, which is just about the winter solstice,—so that, by her privilege, we have seven days and seven nights, in the very heart of winter, wherein we may sail without danger."

Montaigne is equally undoubting in his faith as to the wonderful construction of the halcyon's nest. "The most inquisitive into the secrets of nature could never yet arrive at the knowledge of the wonderful fabric and architecture wherewith the halcyon builds her nest for her little ones, nor guess at the matter. Plutarch, who has seen and handled many of them, thinks 'it is the bones of some fish, which with her beak and no other instrument she joins and binds together, interlacing them some lengthwise, and others across, and adding ribs and hoops in such manner, that she forms at last a round vessel fit to launch, which being done, and the building finished, she carries it to the edge of the sea beach, where the waves beating gently against it shows her where to mend what is not well joined and knit, and where better to fortify the seams that are leaky and open at the beating of the waves, and on the contrary, what is well built and has had due finishing, the beating of the waves does so close and bind together, that it is not to be broken or cracked, by blows either of stone or iron, without a great deal of trouble. What is still more to be admired is the proportion and figure of the cavity within, which is composed and proportioned after such a manner that it is not possible to receive or admit any other thing save the bird which built it, for to every thing else it is so impenetrable, close and shut, that nothing can enter, not even the water of the sea.' See here," adds Montaigne, "a very clear description of this building, and borrowed from a very good hand, and yet methinks it does not give a sufficient light into the difficulty of this architecture."

To us, says Mr Rennie in his *Architecture of Birds*, it appears that what Plutarch took for the nest of the halcyon was simply the crustaceous covering of some of the sea urchins (*Echinidæ*), which agree in most particulars with his description. The most common of the shells, perhaps, is the edible one (*Echinus esculentus*) found on sea rocks near low-water mark, and varying in size from that of a small orange to nearly that of a cocoa-nut, and in colour from almost white to reddish orange. When alive, or recent and uninjured, it is covered with numerous blunt spines disposed in rows, but frequently crossing each other at various angles, so as to give some colour to Plutarch's notion of interlacing, and the comparison of Ælian to basket-making, while the whole crust, readily separating into five triangular sections, doubtless gave rise to the notion of "ribs and hoops," particularly as these sections are themselves marked with ribs. The peculiar closure of the mouth also appears to have suggested the wonders respecting the exclusion of sea water, and the mouth (always on the under part) is furnished with five teeth, not placed in line nor in jaws, but disposed circularly, in a frame

bottom to a good size ; and lining it with the down of the willow, lay its eggs there without any further preparation.

Its nest, or rather hole, is very different from that described by the ancients, by whom it is said to be made in the shape of

which has been denominated Diogenes' lantern, and meeting in a central point.

Belon, who found the kingfisher plentiful on the banks of the Hebrus, in Thrace, appears to have been the first author who correctly stated that it makes its nest by mining into the sand, and was somewhat fearful that he should not be credited because he contradicted the ancients. Up to the present time, however, more or less misrepresentation has been introduced into the descriptions of its burrow. Gesner furnishes it with a soft bed of reed flowers ; Goldsmith says it lines its hole with the down of the willow ; and colonel Montagu, half reverting to the ball of fish bones described by Aristotle, tells us that at the end of the hole there is a kind of bedding formed of the bones of small fish and some other substances, evidently the castings of the parent birds, generally about half an inch thick, and mixed in with the earth. He farther thinks there is every reason to suppose that both the male and the female come to this spot to eject the refuse of their food for some time before the latter begins to lay, and that they dry it by the heat of their bodies, as they are frequently known to continue in the hole for hours long before laying ; and on this disgorged matter the female deposits and hatches her eggs. Belon's account is very similar.

From the high authority of Montagu, the latter description is now copied as authentic by every modern author, with the exception of Temminck, who says nothing on the subject, and Wilson, who says of his belted kingfisher, that "its nest is neither constructed of glue nor fish-bones." We are certain, says Mr Rennie, that this contradiction of the general belief will apply equally to the kingfisher of England. In the bank of a stream at Lee, in Kent, we have been acquainted with one of these nests in the same hole for several successive summers, but so far from the pellets of fish-bones, ejected as is done by all birds of prey, being dried on purpose to form the nest, they are scattered about the floor of the hole in all directions, from its entrance to its termination, without the least order or working up with the earth, and are all moist and fetid. That the eggs may by accident be laid upon portions of these fish-bones, is highly probable, for the floor is so thickly strewn with them, that no vacant spot might be found ; but they assuredly are not by design built into a nest. The hole is from two to four feet long, sloping upwards, and narrow at the entrance, but widening in the interior, in order, perhaps, to give the birds room to turn ; and for the same apparent reason the eggs are not placed at the extremity. We are somewhat doubtful whether it selects, as is said, the old hole of a water-rat to save itself trouble, the water-rat being the deadly enemy of its eggs and young ; but it seems to indicate a dislike to the labour of digging, that it frequents the same hole for a series of years, and will not abandon it, though the nest be repeatedly plundered. The accumulation of cast bones in one of these old holes has perhaps given origin to the notion of the nest being formed of them.

Our own opportunities, continues Mr Rennie, of carefully studying the

a long-necked gourd of the bones of the sea-needle. The bones, indeed, are found there in great quantities, as well as the scales of fishes; but these are the remains of the bird's food, and by no means brought there for the purposes of warmth or convenience.

habits of this bird, lead us to remark, that it is not so very shy and solitary as it has been represented, for it has more than once allowed us to approach within a few yards of the bough on which it was perched. Mr Jennings says that it is "rarely if ever found near the habitations of man." On the contrary, we are in the habit of seeing kingfishers very often on the banks of a brook which runs past our garden, not a hundred yards from the house. A kingfisher's nest was found with young last summer on the bank of the same brook, and within gun-shot of a whole row of houses. This fact was stated in the Magazine of Natural History. Another correspondent of Mr Loudon's says, "that for the last nine years, and perhaps more, I have observed that a pair of kingfishers have uniformly constructed their nests in a hole of a bank which projects over a piece of water, on my premises, not one hundred yards from the house." In the summer of 1828, a single kingfisher took up his abode at Stamford Hill, in the immediate neighbourhood of London, in a narrow garden, much frequented, and close to several houses, on occasion of a small pond being stocked with gold-fish. The bird was frequently seen perched upon an ornament in the middle of the pond watching the fish, and was at last shot by the gardener from an apprehension that he would destroy the young fry. The necessity for obtaining its food from streams and shallow ponds causes this bird, however, to frequent secluded places. The belted kingfisher of America, as we have already seen, is partial to mill-dams, in defiance of the clack of the hopper, because there he finds facilities in watching for fish.

It may be interesting, as a sequel to the fancies of the ancients which we have noticed, to mention one or two modern superstitions respecting the kingfisher. "I have once or twice," says Mrs Charlotte Smith, "seen a stuffed bird of this species hung up to the beam of a cottage ceiling, and imagined that the beauty of the feathers had recommended it to this sad pre-eminence, till, on inquiry, I was assured that it served the purpose of a weather vane; and though sheltered from the immediate influence of the wind, never failed to show every change by turning its beak to the quarter whence the wind blew." This was an old superstition, for Shakspeare, speaking of sycophants, says, they

"Turn their haleyon beaks
With every gale and vary of their masters."

The learned but somewhat credulous author of the '*Physicæ Curiosæ*,' asserts the same upon the testimony of his own observation. "Father Athanasius Kircher," he says, "had one of those birds sent him in a present by a friend, and being disembowelled and dried, it was suspended from the ceiling of his celebrated museum from 1610 to 1655, when I left Rome, and though all the doors and windows were shut, it constantly turned its bill towards the wind; and this I myself observed with admiration and pleasure almost every day for the space of three years." It would be useless to follow the author in the fanciful philo-ophy by which he pretends, after Kir-

The king-fisher, as Bellonius says, feeds upon fish, but is incapable of digesting the bones and scales, which he throws up again, as eagles and owls are seen to do a part of their prey. These fill the bird's nest of course ; and although they seem as if designedly placed there, are only a kind of nuisance.

In these holes, which, from the remains of fish brought there, are very foetid, the king-fisher is often found with from five eggs to nine. There the female continues to hatch, even though disturbed ; and though the nest be robbed, she will again return and lay there. " I have had one of those females brought me," says Reaumur, " which was taken from her nest about three leagues from my house. After admiring the beauty of her colours, I let her fly again, when the fond creature was instantly seen to return back to the nest where she had just before been made a captive. There, joining the male, she again began to lay, though it was for the third time, and though the season was very far advanced. At each time she had seven eggs. The older the nest is, the greater quantity of fish-bones and scales does it contain : these are disposed without any order ; and sometimes take up a good deal of room."

The female begins to lay early in the season ; and excludes her first brood about the beginning of April. The male, whose fidelity exceeds even that of the turtle, brings her large provisions of fish while she is thus employed ; and she, contrary to most other birds, is found plump and fat at that season. The male,

cher, the possessor of the bird, to account for the phenomenon ; for, notwithstanding his personal testimony, the whole story is evidently no less fabulous than the tradition of the dried body of the same bird having the property of preserving cloth and woollen stuffs from the moth, which once induced drapers to hang it up in their shops. But this is nothing to the pretended power of the lifeless skin of averting thunder, augmenting hidden treasure, bestowing grace and beauty on the person who carries it, and renewing its plumage each season of moulting.

Gmelin tells us that the Tartars pluck the feathers from a kingfisher, " cast them into the water, and carefully preserve such as float, pretending that, if with one of these feathers they touch a woman, or even her clothes, she must fall in love with them. The Ostiaks take the skin, the bill, and the claws of this bird, shutting them up in a purse, and so long as they preserve this sort of amulet they believe they have no ill to fear. The person who taught me this means of living happy could not forbear shedding tears while he told me that the loss of a kingfisher's skin had caused him to lose both his wife and his goods." Forster our navigator, records a similar superstition in the people of Ulitea.

that used to twitter before this, now enters the nest as quietly and as privately as possible. The young ones are hatched at the expiration of twenty days ; but are seen to differ as well in their size as in their beauty.

As the ancients have had their fables concerning this bird, so have the modern vulgar. It is an opinion generally received among them, that the flesh of the king-fisher will not corrupt, and that it will even banish all vermin. This has no better foundation than that which is said of its always pointing, when hung up dead with its breast to the north. The only truth which can be affirmed of this bird, when killed, is, that its flesh is utterly unfit to be eaten ; while its beautiful plumage preserves its lustre longer than that of any other bird we know.

Having thus given a short history of birds, I own I cannot take leave of this most beautiful part of the creation without reluctance. These splendid inhabitants of the air possess all those qualities than can soothe the heart, and cheer the fancy. The brightest colours, the roundest forms, the most active manners, and the sweetest music. In sending the imagination in pursuit of these, in following them to the chirping grove, the screaming precipice, or the glassy deep, the mind naturally lost the sense of its own situation, and attentive to their little sports, almost forgot the TASK of describing them. Innocently to amuse the imagination in this dream of life is wisdom ; and nothing is useless that, by furnishing mental employment, keeps us for a while in oblivion of those stronger appetites that lead to evil. But every rank and state of mankind may find something to imitate in those delightful songsters, and we may not only employ the time, but mend our lives, by the contemplation. From their courage in defence of their young, and their assiduity in incubation, the coward may learn to be brave, and the rash to be patient. The inviolable attachment of some to their companions may give lessons of fidelity ; and the connubial tenderness of others be a monitor to the incontinent. Even those that are tyrants by nature never spread capricious destruction ; and, unlike man, never inflict a pain but when urged by necessity.

A
HISTORY OF FISHES.

BOOK I.
OF FISHES IN GENERAL.

CHAP. I.

INTRODUCTION.

THE ocean is the great receptacle of fishes. It has been thought, by some, that all fish are naturally of that salt element ; and that they have mounted up into fresh water by some accidental migration. A few still swim up rivers to deposit their spawn ; but of the great body of fishes, of which the size is enormous, and the shoals are endless, those all keep to the sea, and would quickly expire in fresh water. In that extensive and undiscovered abode, millions reside, whose manners are a secret to us, and whose very form is unknown. The curiosity of mankind, indeed, has drawn some from their depths, and he wants many more : with the figure of these at least he is acquainted ; but for their pursuits, migrations, societies, antipathies, pleasures, times of gestation, and manner of bringing forth, these are all hidden in the turbulent element that protects them.

The number of fish to which we have given names, and of the figure, at least, of which we know something, according to Linnaeus, are above four hundred.* Thus to appearance, indeed, the history of fish is tolerably copious ; but when we come to examine, it will be found that of the greatest part of these we know very little. Those qualities, singularities, or advantages, that render animals worth naming, still remain to be discovered. The history of fishes, therefore, has little in it entertaining : for our philosophers hitherto, instead of studying their nature, have

* About 1500 species of fish are now known, and of this number about 200 are found on the coast or in the inland waters of Britain.

been employed in increasing their catalogues ; and the reader, instead of observations or facts, is presented with a long list of names, that disgust him with their barren superfluity. It must displease him to see the language of science increasing, while the science itself has nothing to repay the increasing tax laid upon his memory.

Most fish offer us the same external form ; sharp at either end, and swelling in the middle ; by which they are enabled to traverse the fluid which they inhabit, with greater celerity and ease. That peculiar shape which Nature has granted to most fishes, we endeavour to imitate in such vessels as are designed to sail with the greatest swiftness : however, the progress of a machine moved forward in the water by human contrivance, is nothing to the rapidity of an animal destined by nature to reside there. Any of the large fish overtake a ship in full sail with great ease, play round it without effort, and outstrip it at pleasure. Every part of the body seems exerted in this despatch ; the fins, the tail, and the motion of the whole back-bone, assist progression ; and it is to that flexibility of body at which art cannot arrive, that fishes owe their great velocity.

The chief instrument in a fish's motion, are the fins, which, in some fish, are much more numerous than in others. A fish completely fitted for sailing, is furnished with not less than two pair ; also three single fins, two above and one below. Thus equipped, it migrates with the utmost rapidity, and takes voyages of a thousand leagues in a season. But it does not always happen that such fish as have the greatest number of fins have the swiftest motion ; the shark is thought to be one of the swiftest swimmers, yet it wants the ventral or belly fins ; the haddock does not move so swift, yet it is completely fitted for motion.

But the fins serve not only to assist the animal in progression, but in rising or sinking, in turning, or even leaping out of the water. To answer these purposes, the pectoral fins serve, like oars, to push the animal forward ; they are placed at some little distance behind the opening of the gills ; they are generally large and strong, and answer the same purposes to the fish in the water, as wings do to a bird in the air. With the help of these, and by their continued motion, the flying fish is sometimes seen to rise out of the water, and to fly above a hundred yards ; till,

fatigued with its exertions, it is obliged to sink down again. These also serve to balance the fish's head, when it is too large for the body, and keep it from tumbling down to the bottom, as is seen in large-headed fishes, when the pectoral fins are cut off. Next these are seen the ventral fins, placed towards the lower part of the body, under the belly; these are always seen to lie flat on the water, in whatever situation the fish may be; and they serve rather to raise or depress the fish in its element, than to assist progressive motion. The dorsal fin is situated along the ridge of the back; and serves to keep it in equilibrio, as also to assist its progressive motion. In many fishes this is wanting; but in all flat fishes it is very large, as the pectoral fins are proportionably small. The anal fin occupies that part of the fish which lies between the anus and the tail; and this serves to keep the fish in its upright or vertical situation. Lastly, the tail, which in some fishes is flat, and upright in others, seems the grand instrument of motion; the fins are but all subservient to it, and give direction to its great impetus, by which the fish seems to dart forward with so much velocity. To explain all this by experiment; a carp is taken, and put into a large vessel. The fish, in a state of repose, spreads all its fins, and seems to rest upon its pectoral and ventral fins near the bottom; if the fish folds up (for it has the power of folding) either of its pectoral fins, it inclines to the same side; folding the right pectoral fin, the fish inclines to the right side; folding the left fin, it inclines to that side in turn. When the fish desires to have a retrograde motion, striking with the pectoral fins, in a contrary direction, effectually produces it. If the fish desires to turn, a blow from the tail sends it about; but if the tail strikes both ways, then the motion is progressive. In pursuance of these observations, if the dorsal and ventral fins be cut off, the fish reels to the right and left, and endeavours to supply its loss by keeping the rest of its fins in constant employment. If the right pectoral fin be cut off, the fish leans to that side; if the ventral fin on the same side be cut away, then it loses its equilibrium entirely. When the tail is cut off, the fish loses all motion, and gives itself up to where the water impels it.

From hence it appears, that each of these instruments has a peculiar use assigned it; but, at the same time, that they all conspire to assist each other's motions. Some fish are possess

ed of all, whose motions are yet not the swiftest; others have but a part, and yet dart in the water with great rapidity. The number, the size, and the situation of the fins, therefore, seem rather calculated to correspond with the animal's figure, than solely to answer the purposes of promoting its speed. Where the head is large and heavy, there the pectoral fins are large, and placed forward, to keep it from oversetting. Where the head is small, or produced out into a long beak, and therefore not too heavy for the tail, the pectoral fins are small, and the ventral fins totally wanting.

As most animals that live upon land are furnished with a covering to keep off the injuries of the weather, so all that live in the water are covered with a slimy glutinous matter, that, like a sheath, defends their bodies from the immediate contact of the surrounding fluid. This substance may be considered as a secretion from the pores of the animal's body; and serving not only to defend, but to assist the fish's easy progress through the water. Beneath this, in many kinds, is found a strong covering of scales, that, like a coat of mail, defend it still more powerfully; and under that, before we come to the muscular parts of the body, an oily substance, which supplies the requisite warmth and vigour.

The fish thus protected and fitted for motion in its natural element, seems as well furnished with the means of happiness as quadrupeds or birds; but if we come to examine its faculties more nearly, we shall find it very much their inferior. The sense of touching, which beasts and birds have in a small degree, the fish, covered up in its own coat of mail, can have but little acquaintance with.

The sense of smelling, which in beasts is so exquisite, and among birds is not wholly unknown, seems given to fishes in a very moderate proportion.* It is true, that all fishes have one or more nostrils; and even those that have not the holes perceptible without, yet have the proper formation of the bones for smelling within. But as air is the only medium we know for the distribution of odours, it cannot be supposed that these animals, residing in water, can be possessed of any power of being affected by them. If they have any perception of smells, it

* There is now no doubt but that fishes possess the sense of smelling. Indeed, it seems to be mostly by their smell that they discover their food.

must be the same manner as we distinguish by our taste ; and, it is probable, the olfactory membrane in fish serves them instead of a distinguishing palate ; and by this they judge of substances, that, first tincturing the water with their vapours, are thus sent to the nostrils of the fish, and no doubt produce some kind of sensation. This most probably must be the use of that organ in those animals, as otherwise there would be the instruments of a sense provided for them, without any power in them of enjoyment.

As to tasting, they seem to make very little distinction ; the palate of most fish is hard and bony, and consequently incapable of the powers of relishing different substances. This sense among quadrupeds, who possess it in some degree, arises from the soft pliancy of the organ, and the delicacy of the skin which covers the instruments of tasting ; it may be considered, in them, as a more perfect and delicate kind of feeling : in the bony palate of fish, therefore, all powers of distinguishing are utterly taken away ; and we have accordingly often seen these voracious animals swallow the fisherman's plummet instead of the bait.

Hearing in fishes is found still more imperfect, if it be found at all. Certain it is, that anatomists have not been able to discover, except in the whale kind, the smallest traces of an organ, either within or without the head of fishes. It is true, that in the centre of the brain of some fishes are found now and then some little bones, the number and situation of which are entirely accidental. These bones, Mr Klein has supposed to constitute the organ of hearing ; but if we consider their entire dissimilitude to the bones that serve for hearing in other animals, we shall be of another opinion. The greatest number of fishes are deprived of these bones entirely : some fish have them in small numbers, and others in abundance ; yet neither testify any excellence or defect in hearing. Indeed, of what advantage would this sense be to animals that are incapable of making themselves heard ? They have no voice to communicate to each other, and consequently have no need of an organ for hearing. Mr Gouan, who kept some gold fishes in a vase, informs us, that whatever noise he made, he could neither disturb nor terrify them ; he halloed as loud as he could, putting a piece of paper between his mouth and the water, to prevent the vibrations from affecting the surface, and the fishes still seemed insensible : but when the paper

was removed, and the sound had its full play upon the water, the fishes seemed instantly to feel the change, and shrunk to the bottom. From this we may learn, that fishes are as deaf as they are mute; and that when they seem to hear the call of a whistle or a bell at the edge of a pond, it is rather the vibrations of the sound that affect the water, by which they are excited, than any sounds that they hear.*

Seeing seems to be the sense fishes are possessed of in the greatest degree; and yet even this seems obscure, if we compare it to that of other animals. The eye, in almost all fish, is covered with the same transparent skin that covers the rest of the head; and which, probably, serves to defend it in the water, as they are without eyelids. The globe is more depressed anteriorly, and is furnished behind with a muscle, which serves to lengthen or flatten it, according to the necessities of the animal. The crystalline humour, which in quadrupeds is flat, and of the shape of a button-mould, in fishes is round as a pea; or sometimes oblong, like an egg. From all this it appears that fish are extremely near-sighted; and that even in the water they can see objects at a very small distance. This distance might very easily be ascertained, by comparing the refraction of bodies in the water with that formed by a lens that is spherical. Those unskilled in mathematical calculations, will have a general idea of this, from the glasses used by near-sighted people. Those whose crystalline humour is too convex, or, in other words, too round, are always very near-sighted; and obliged to use concave glasses, to correct the imperfections of nature. The crystalline humour of fish is so round, that it is not in the power of any glasses, much less of water, to correct their vision. This crystalline humour in fishes all must have seen; being that little

* It was well ascertained by Dr John Hunter that fishes possess the sense of hearing, and that water is an excellent medium for the conveyance of sound. Their organ of hearing is placed on the sides of the skull, or the cavity that contains the brain; but, differing in this respect from that in quadrupeds and birds, it is entirely distinct and detached from the skull. In some fishes, as those of the ray kind, the organ of hearing is wholly surrounded by the parts containing the cavity of the skull; in others, as the salmon and cod, it is in part within the skull. In structure it is by no means so complicated as in the quadrupeds and other animals who live in the air. Some genera, as the rays, have the external orifice very small, and placed on the upper surface of the head; but in others there is no external opening whatever.

hard pea-like substance which is found in their eyes after boiling. In the natural state it is transparent, and not much harder than a jelly.

From all this it appears how far fish fall behind terrestrial animals in their sensations, and consequently in their enjoyments.* Even their brain, which is by some supposed to be of a size with every animal's understanding, shows that fish are inferior even to birds in this particular. It is divided into three parts, surrounded with a whitish froth, and gives off nerves as well to the sense of sight as of smelling. In some fish it is gray, in others white; in some it is flattened, in others round; but in all extremely small, compared to the bulk of the animal.

* The following fine comparison is made by Baron Cuvier between fishes and birds. "The aerial being discovers with facility an immense horizon: its subtile ear appreciates every sound, every intonation, which it reproduces with its voice. If its beak is hard, if its body is covered with a kind of down, to preserve it from the intense cold of the high regions which it visits, it finds in its legs all the perfection of the most delicate touch. It enjoys all the sweets of conjugal and paternal love, and it fulfils all its duties with courage. The parents defend each other, and also their offspring,—a most surprising art presides in the construction of their habitations. When the season is come they work together and without remission; while the mother hatches the eggs with an extraordinary patience, the father from an impetuous lover, becomes the most tender husband, and delights with his songs the melancholy of his mate. The bird even in confinement attaches itself to its master; it submits to him, and executes, by his order, the most neat and delicate actions; it hunts for him like the dog, and returns at his voice from the greatest height in the air; it imitates even his language, and it is with some degree of difficulty that we are compelled to refuse it a kind of reason.

"The inhabitant of the water does not attach itself. It has no language, no affection; it does not know what it is to be husband and father, or to make an abode for itself. In time of danger it hides itself under the rocks of the ocean, or rushes down into the depths of the sea; its life is monotonous; its voracity leads to its sole employment, and it is only thereby that we are able to direct its motions by certain signs from above. Yet these beings who possess so few enjoyments, have been adorned by nature with all kinds of beauty, variety in their forms, elegance in their proportions, diversity of colour: they have every thing adapted to attract the attention of man, and it seems that it was this attention that nature was desirous to excite. Reflecting the lustre of every metal and precious stone, refracting the colours of the rainbow, in bands, in spots, in undulating, angular, but always regular and symmetrical lines, and always in shades admirably arranged and contrasted; for what purpose have they received these gifts—they who hardly see one another in depths where light can scarcely penetrate, and who, could they gaze on one another, can scarcely be supposed to feel any kind of pleasure by relations thus established?"

Thus Nature seems to have fitted these animals with appetites and powers of an inferior kind ; and formed them for a sort of passive existence in the obscure and heavy element to which they are consigned. To preserve their own existence, and to continue it to their posterity, fill up the whole circle of their pursuits and enjoyments ; to these they are impelled rather by necessity than choice, and seem mechanically excited to every fruition. Their senses are incapable of making any distinctions ; but they drive forward in pursuit of whatever they can swallow, conquer, or enjoy.

A ceaseless desire of food seems to give the ruling impulse to all their motions. This appetite impels them to encounter every danger ; and indeed their rapacity seems insatiable. Even when taken out of the water, and almost expiring, they greedily swallow the very bait by which they were allured to destruction.

The maw is, in general, placed next the mouth, and though possessed of no sensible heat, is, however, endued with a surprising facility of digestion. Its digestive power seems, in some measure, to increase with the quantity of food it is supplied with ; a single pike having been known to devour a hundred roaches in three days. Its faculties also are as extraordinary ; for it digests not only fish, but much harder substances ; prawns, crabs, and lobsters, shells and all. These the cod or the sturgeon will not only devour, but dissolve down, though their shells are so much harder than the sides of the stomach which contains them. This amazing faculty in the cold maw of fishes, has justly excited the curiosity of philosophers ; and has effectually overturned the system of those who supposed that the heat of the stomach was alone a sufficient instrument for digestion. The truth seems to be, and some experiments of the skilful Dr Hunter seem to evince, that there is a power of animal assimilation lodged in the stomach of all creatures, which we can neither describe nor define, converting the substances they swallow into a fluid fitted for their own peculiar support. This is done neither by trituration, nor by warmth, nor by motion, nor by a dissolving fluid, nor by their united efforts ; but by some principle in the stomach yet unknown, which acts in a different manner from all kinds of artificial maceration. The meat taken into the stomach or maw is often seen, though very near being digested, still to retain its original form, and ready

for a total dissolution, while it appears to the eye as yet untouched by the force of the stomach. This animal power is lodged in the maw of fishes, in a greater degree than in any other creatures; their digestive powers are quick, and their appetites are ever craving.

Yet though fish are thus hungry, and for ever prowling, no animals can suffer the want of food for so long a time. The gold and silver fish we keep in vases seem never to want any nourishment at all: whether it be that they feed on the water-insects, too minute for our observation, or that water alone is a sufficient supply, is not evident; but they are often seen for months without apparent sustenance. Even the pike, the most voracious of fishes, will live in a pond where there is none but himself; and, what is more extraordinary, will be often found to thrive there.

Still, however, fishes are of all other animals the most voracious and insatiable. Whatever any of them is able to swallow, possessed of life, seems to be considered as the most desirable food. Some that have very small mouths feed upon worms and the spawn of other fish; others, whose mouths are larger, seek larger prey; it matters not of what kind, whether of another or their own. Those with the largest mouths pursue almost every thing that has life; and often meet each other in fierce opposition, when the fish with the largest swallow comes off with the victory and devours its antagonist.

Thus are they irritated by the continual desire of satisfying their hunger; and the life of a fish, from the smallest to the greatest, is but one scene of hostility, violence, and evasion. But the smaller fry stand no chance in the unequal combat; and their usual way of escaping is by swimming into those shallows where the greater are unable, or too heavy, to pursue. There they become invaders in turn, and live upon the spawn of larger fish, which they find floating upon the surface of the water; yet there are dangers attending them in every place. Even in the shallows, the mussel, the oyster, and the scallop, lie in ambush at the bottom, with their shells open, and whatever little fish inadvertently approaches into contact, they at once close their shells upon him, and devour the imprisoned prey at their leisure.

Nor is the pursuit of fishes, like that of terrestrial animals,

confined to a single region, or to one effort : shoals of one species follow those of another through vast tracks of ocean, from the vicinity of the pole, even down to the equator. Thus the cod, from the banks of Newfoundland, pursues the whiting, which flies before it even to the southern shores of Spain. The cachelot is said, in the same manner, to pursue a shoal of herrings, and to swallow thousands at a gulp.

This may be one cause of the annual migration of fishes from one part of the ocean to the other ; but there are other motives which come in aid of this also. Fishes may be induced to change the place of their residence, for one more suited to their constitutions, or more adapted to depositing their spawn. It is remarkable that no fish are fond of very cold waters, and generally frequent those places where it is warmest. Thus, in summer, they are seen in great numbers in the shallows near the shore, where the sun has power to warm the water to the bottom ; on the contrary, in winter, they are found towards the bottom in the deep sea ; for the cold of the atmosphere is not sufficiently penetrating to reach them at those great depths. Cold produces the same effect upon fresh-water fishes ; and when they are often seen dead after severe frosts, it is most probable that they have been killed by the severity of the cold, as well as by their being excluded by the ice from air.

All fish live in the water ; yet they all stand in need of air for their support. Those of the whale kind, indeed, breathe air in the same manner as we do, and come to the surface every two or three minutes to take a fresh inspiration ; but those which continue entirely under water are yet under a necessity of being supplied with air, or they will expire in a very few minutes. We sometimes see all the fish of a pond killed, when the ice every where covers the surface of the water, and thus keeps off the air from the sub-adjacent fluid. If a hole be made in the ice, the fish will be seen to come all to that part, in order to take the benefit of a fresh supply. Should a carp, in a large vase of water, be placed under an air-pump, and then be deprived of its air, during the operation a number of bubbles will be seen standing on the surface of the fish's body ; soon after the animal will appear to breathe swifter, and with greater difficulty ; it will then be seen to rise towards the surface, to get more air ; the bubbles on its surface begin to disappear ; the belly, that was before swollen,

will then fall of a sudden; and the animal sinks expiring and convulsed at the bottom.

So very necessary is air to all animals, but particularly to fish, that, as was said, they can live but a few minutes without it; yet nothing is more difficult to be accounted for than the manner in which they obtain this necessary supply. Those who have seen a fish in the water must remember the motion of its lips and its gills, or at least of the bones on each side that cover them. This motion in the animal is, without doubt, analogous to our breathing; but it is not air, but water, that the fish actually sucks in and spouts out through the gills at every motion. The manner of its breathing is thus: the fish first takes in a quantity of water by the mouth, which is driven to the gills; these close and keep the water so swallowed from returning by the mouth; while the bony covering of the gills prevents it from going through them, until the animal has drawn the proper quantity of air from the body of water thus imprisoned: then the bony-covers open, and give it a free passage: by which means also the gills again are opened, and admit a fresh quantity of water. Should the fish be prevented from the free play of its gills, or should the bony-covers be kept from moving, by a string tied round them, the animal would soon fall into convulsions, and die in a few minutes.

But though this be the general method of explaining respiration in fishes, the difficulty remains to know what is done with this air, which the fish in this manner separates from the water. There seems to be no receptacle for containing it; the stomach being the chief cavity within the body, is too much filled with aliment for that purpose. There is indeed a cavity, and that a pretty large one, I mean the air-bladder or swim, which may serve to contain it for vital purposes; but that our philosophers have long destined to a very different use. The use universally assigned to the air-bladder, is the enabling the fish to rise or sink in the water at pleasure, as that is dilated or compressed. The use assigned by the ancients for it was to come in aid of the lungs, and to remain as a kind of store-house of air to supply the animal in its necessities. I own my attachment to this last opinion; but let us exhibit both with their proper share of evidence, and the reader must be left to determine.

The air-bladder is described as a bag filled with air, sometimes

composed of one, sometimes of two, and sometimes of three divisions, situated towards the back of the fish, and opening into the maw or gullet. Those who contend that this bag is designed for raising or depressing the fish in the water, build upon the following experiment. A carp being put into the air-pump, and the air exhausted, the bladder is said to expand itself to such a degree, that the fish swells in an extraordinary manner, till the bladder bursts, and then the fish sinks, and ever after continues to crawl at the bottom. On another occasion, the air-bladder was pricked and wounded, which let out its air; upon which the fish sunk to the bottom, and was not seen to rise after. From thence it is inferred, that the use of the air-bladder must be by swelling, at the will of the animal, thus to increase the surface of the fish's body, and thence diminishing its specific gravity, to enable it to rise to the top of the water, and keep there at pleasure. On the contrary, when the fish wants to descend, it is, say they, but to exhaust this bladder of its air; and the fish being thus rendered slimmer and heavier, consequently sinks to the bottom.

Such is the account given of the use of the air-bladder; no part of which seems to me well supported. In the first place, though nothing is more certain than that a carp put into the air-pump will swell, yet so will a mouse or a frog; and these we know to have no air-bladders. A carp will rise to the surface; but so will all fish that want air, whether they have an air-bladder or not. The air-bladder is said to burst in the experiment; but that I deny. The air-bladder is indeed found empty, but it has suffered no laceration, and may be distended by being blown into like any other bladder that is sound. The fish after the experiment, I grant, continues to creep at the bottom; and so will all fish that are sick and wounded, which must be the case with this after such an operation. Thus these facts prove nothing, but that when the fish is killed in an air-pump the air-bladder is found exhausted, and that it will naturally and necessarily be; for the drain of air by which the fish is supplied in the natural way will necessarily oblige it to make use of all its hidden stores; and, as there is a communication between the gullet and the air-bladder, the air which the latter contains will thus be obviously drawn away. But still farther, how comes the air-bladder, according to their hypothesis, to swell under the experiment

of the air-pump? What is it that closes the aperture of that organ in such a manner as at last to burst it? or what necessity has the fish for dilating it to that violent degree? At most, it only wants to rise to the surface; and that the fish can easily do without so great a distention of the air-bladder. Indeed it should rather seem that the more the air was wanted without, the less necessity there was for its being uselessly accumulated within; and, to make the modern system consistent, the fish under the air-pump, instead of permitting its bladder to burst, would readily give up its contents; which, upon their supposition, all can do at pleasure.

But the truth is, the fish can neither increase nor diminish the quantity of air in its air-bladder at will, no more than we can that which is contained in our stomachs. The animal has no one muscle, much less a pair of muscles, for contracting or dilating this organ; its aperture is from the gullet; and what air is put into it must remain there till the necessities, and not the will of the animal call it forth as a supply.

But, to put the matter past a doubt, many fish are furnished with an air-bladder, that continually crawl at the bottom; such as the eel and the flounder; and many more are entirely without any bladder, that swim at ease in every depth; such as the anchovy and fresh-water gudgeon.¹ Indeed, the number of fish that want this organ is alone a sufficient proof that it is not so necessary for the purposes of swimming; and as the ventral fins, which in all fish lie flat upon the water, seem fully sufficient to keep them at all depths, I see no great occasion for this internal philosophical apparatus for raising and depressing them. Upon the whole, the air-bladder seems adapted for different purposes than that of keeping the fish at different depths in the water; but whether it be to supply them with water when it is wanted from without, or for what other purpose, I will not take upon me to determine.

Hitherto we have seen fish in every respect inferior to land animals; in the simplicity of their conformation, in their senses, and their enjoyments; but of that humble existence which they have been granted by nature, they have a longer term than any other class of animated nature. “Most of the disorders incident

to mankind," says Bacon, "arise from the changes and alterations of the atmosphere ; but fishes reside in an element little subject to change ; theirs is a uniform existence ; their movements are without effort, and their life without labour. Their bones also, which are united by cartilages, admit of indefinite extension ; and the different sizes of animals of the same kind, among fishes, is very various. They still keep growing ; their bodies, instead of suffering the rigidity of age, which is the cause of natural decay in land animals, still continue increasing with fresh supplies ; and as the body grows, the conduits of life furnish their stores in greater abundance. How long a fish, that seems to have scarcely any bounds put to its growth, continues to live, is not ascertained ; perhaps the life of a man would not be long enough to measure that of the smallest."

There have been two methods devised for determining the age of fishes which are more ingenious than certain ; the one is by the circles of the scales, the other by the transverse section of the back-bone. The first method is this : When a fish's scale is examined through a microscope, it will be found to consist of a number of circles, one circle within another, in some measure resembling those which appear upon the transverse section of a tree, and supposed to offer the same information. For as in trees we can tell their age by the number of their circles, so in fishes we can tell theirs by the number of circles in every scale, reckoning one ring for every year of the animal's existence. By this method, Mr Buffon found a carp, whose scales he examined, to be not less than a hundred years old ; a thing almost incredible, had we not several accounts in other authors which tend to confirm the discovery. Gesner brings us an instance of one of the same age ; and Albertus of one more than double that period.

The age of the skate and the ray, that want scales, may be known by the other method ; which is, by separating the joints of the back-bone, and then minutely observing the number of rings, which the surface where it has joined exhibits. By this the fish's age is said to be known ; and perhaps with as much certainty as in the former instance.

But how unsatisfactory soever these marks may be, we have no reason to doubt the great age of some fishes. Those that have ponds, often know the oldest by their superior size. But the longevity of these animals is nothing when compared to their

fecundity. All sorts, a few of the larger ones excepted, multiply their kind, some by hundreds, and some by millions. There are some that bring forth their young alive, and some that only produce eggs: the former are rather the least fruitful; yet even these are seen to produce in great abundance. The viviparous blenny, for instance, brings forth two or three hundred at a time, all alive, and playing round the parent together. Those who exclude their progeny in a more imperfect state, and produce eggs, which they are obliged to leave to chance, either on the bottom, at the edge of the water, or floating on the surface where it is deeper, are all much more prolific; and seem to proportion their stock to the danger there is of its consumption. Of these eggs thus deposited, scarcely one in a hundred brings forth an animal; they are devoured by all the lesser fry that frequent the shores; by aquatic birds near the margin; and by the larger fish in deep water. Still, however, there are enough for supplying the deep with inhabitants; and, notwithstanding their own rapacity, and that of the fowls of various tribes, the numbers that escape are sufficient to relieve the wants of a very considerable part of mankind. Indeed, when we consider the numbers that a single fish is capable of producing, the amount will seem astonishing. If, for instance, we should be told of a being so very prolific, that in a single season it could bring forth as many of its kind as there are inhabitants in England, it would strike us with surprise; yet a single cod produces full that number. The cod spawns in one season, as Lewenhoeck assures us, above nine million of eggs or peas, contained in one single roe. The flounder is commonly known to produce above one million; and the mackarel above five hundred thousand. Such an amazing increase, if permitted to come to maturity, would overstock nature, and even the ocean itself would not be able to contain, much less to provide for, the half of its inhabitants. But two wise purposes are answered by this amazing increase; it preserves the species in the midst of numberless enemies, and serves to furnish the rest with a sustenance adapted to their nature.

Fishes seem, all except the whale kind, entirely divested of those parental solitudes which so strongly mark the manners of the more perfect terrestrial animals. How far they copulate remains as yet a doubt; for though they seem to join, yet the

male is not furnished with any external instrument of generation. It is said, by some, that his only end in that action is to emit his impregnating milt upon the eggs that at that time fall from the female. He is said to be seen pursuing them as they float down the stream, and carefully impregnating them one after another. On some occasions also the females dig holes in the bottom of rivers and ponds, and there deposit their spawn, which is impregnated by the male in the same manner. All this, however, is very doubtful; what we know with certainty of the matter, and that not discovered till very lately, is, that the male has two organs of generation, that open into the bladder of urine, and that these organs do not open into the rectum as in birds, but have a particular aperture of their own.¹ These organs of generation in the male are empty at some seasons of the year; but before the time of spawning they are turgid with what is called the milt, and emit the fluid proper for impregnation.

Fish have different seasons for depositing their spawn: some, that live in the depths of the ocean, are said to choose the winter months: but, in general, those with which we are acquainted, choose the hottest months in summer, and prefer such water as is somewhat tepidified by the beams of the sun. They then leave the deepest parts of the ocean, which are the coldest, and shoal round the coasts, or swim up the fresh-water rivers, which are warm as they are comparatively shallow. When they have deposited their burdens they then return to their old stations, and leave their nascent progeny to shift for themselves.

The spawn continues in its egg-state in some fish longer than in others, and this in proportion to the animal's size. In the salmon, for instance, the young animal continues in the egg from the beginning of December till the beginning of April; the carp continues in the egg not above three weeks; the little gold fish from China is produced still quicker. These all, when excluded, at first escape by their minuteness and agility. They rise, sink, and turn, much readier than grown fish; and they can escape into very shallow waters when pursued. But, with all their advantages, scarcely one in a thousand survives the numerous perils of its youth. The very male and female that have given them birth are equally dangerous and formidable with the rest, forgetting all relation at their departure.

1 Vide Gannan de Generatione Piscium.

Such is the general picture of these heedless and hungry creatures : but there are some in this class, living in the waters, that are possessed of finer organs and higher sensations ; that have all the tenderness of birds or quadrupeds for their young, that nurse them with constant care, and protect them from every injury. Of this class are the *Cetaceous* tribe, or the fishes of the whale kind. There are others, though not capable of nursing their young, yet that bring them alive into the world, and defend them with courage and activity. These are the *Cartilaginous* kinds, or those who have gristles instead of bones. But the fierce unmindful tribe we have been describing, that leave their spawn without any protection, are called the *Spinous*, or bony kinds, from their bones resembling the sharpness of thorns.

Thus there are three grand divisions in the fish kind ; the *cetaceous*, the *cartilaginous*, and the *spinous* : all differing from each other in their conformation, their appetites, in their bringing forth, and in the education of their young. These three great distinctions are not the capricious differences formed by a maker of systems, but are strongly and firmly marked in Nature. These are the distinctions of Aristotle ; and they have been adopted by mankind ever since his time. It will be necessary, therefore, to give the history of each of these in particular ; and then to arrange, under each head, those fishes whose history is the most remarkable ; or, more properly speaking, those of which we have any history. For we shall find, when we come to any of the species in particular, how little can be said of their habits, their stations, or method of propagation.

Much, indeed, can be said of them if considered relatively to man ; and large books have been written of the manner of taking fish, or of dressing them. Apicius is noted for first having taught mankind to suffocate fish in Carthaginian pickle ; and Quin, for giving a sauce to the John-dory : Mrs Glasse is famous for her eel-pie, and Mr Tull for his invention of spaying carp, to give it a finer flavour. In this manner our cooks handle the subject. On the other hand, our physicians assure us that the flesh of fishes yields little nourishment, and soon corrupts ; that it abounds in a gross sort of oil and water, and hath but a few volatile particles, which render it less fit to be converted into the substance of our bodies. They are cold and moist, and must needs, say they, produce juices of the same kind, and conse-

quently are improper to strengthen the body. In this diversity of opinion, it is the wisest way to eat our fish in the ordinary manner, and pay no great attention to cooks or doctors.

I cannot conclude this chapter without putting a question to the learned, which I confess I am not able to resolve. How comes it that fish, which are bred in a salt element, have yet no salt to the taste, or that is capable of being extracted from them ?

CHAP. II.

OF CETACEOUS FISHES IN GENERAL.

As on land there are some orders of animals that seem formed to command the rest, with greater powers and more various instincts, so in the ocean there are fishes which seem formed upon a nobler plan than others, and that, to their fishy form, join the appetites and the conformation of quadrupeds. These are all of the *cetaceous* kind ; and so much raised above their fellows of the deep, in their appetites and instincts, that almost all our modern naturalists have fairly excluded them from the finny tribes, and will have them called, not fishes, but *great beasts of the ocean*. With them it would be as improper to say men go to Greenland fishing for whale, as it would be to say that a sportsman goes to Blackwall a fowling for mackarel.

Yet, notwithstanding philosophers, mankind will always have their own way of talking ; and, for my own part, I think them here in the right. A different formation of the lungs, stomach, and intestines ; a different manner of breathing or propagating ;

1 Though fishes live in a salt element they do not subsist on it. All the water they take into their mouths is again discharged through the gills, after retaining the air contained in it for the purposes of life. The medium of water answers the precise purpose to fishes, that the medium of air does to man and other land animals. In inspiration, the element is received into the lungs or gills, and in expiration is returned deprived of its purer parts, which are retained for the purpose of animal economy. And whatever salt may be taken into the stomachs of fishes with their food, is decomposed and separated into its component parts of acid and soda. The sailor that feeds for twelve months together on salted meats, has not his own flesh made salt ; but a decomposition taking place during the process of digestion, he becomes corrupted and scorbutic by the excess of soda and magnesia.

are not sufficient to counterbalance the great obvious analogy which these animals bear to the whole finny tribe. They are shaped as other fishes; they swim with fins; they are entirely naked, without hair; they live in the water, though they come up to breathe; they are only seen in the depths of the ocean, and never come upon shore but when forced thither. These, sure, are sufficient to plead in favour of the general denomination, and acquit mankind of error in ranking them with their lower companions of the deep.

But still they are many degrees raised above other fishes in their nature, as they are in general in their size. This tribe is composed of the Whale and its varieties, of the Cachalot, the Dolphin, the Grampus, and the Porpoise. All these resemble quadrupeds in their internal structure, and in some of their appetites and affections. Like quadrupeds, they have lungs, a midriff, a stomach, intestines, liver, spleen, bladder, and parts of generation; their heart also resembles that of quadrupeds, with its partitions closed up as in them, and driving red and warm blood in circulation through the body. In short, every internal part bears a most striking similitude; and to keep these parts warm, the whole kind are also covered, between the skin and the muscles, with a thick coat of fat or blubber, which, like the bacon fat of a hog, keeps out the cold, renders their muscles glib and pliant, and probably makes them lighter in swimming.

As these animals breathe the air, it is obvious that they cannot bear to be any long time under water. They are constrained, therefore, every two or three minutes, to come up to the surface to take breath, as well as to spout out through their nostril (for they have but one) that water which they sucked in while gaping for their prey. This conduit by which they breathe, and also throw out the water, is placed in the head, a little before the brain. Though externally the hole is but single, it is internally divided by a bony partition, which is closed by a sphincter muscle on the inside, that, like the mouth of a purse, shuts it up at the pleasure of the animal. There is also another muscle or valve, which prevents the water from going down the gullet. When therefore, the animal takes in a certain quantity of water, which is necessary to be discharged and separated from its food, it shuts the mouth, closes the valve of the stomach, opens the sphincter that kept the nostril closed, and then breath-

ing strongly from the lungs, pushes the water out by effort, as we see it rise by the pressure of air in a fire-engine.

The senses of these animals seem also superior to those of other fishes. The eyes of other fishes, we have observed, are covered only with transparent skin that covers the rest of the head; but in all the cetaceous kinds, it is covered by eye-lids, as in man. This, no doubt, keeps that organ in a more perfect state, by giving it intervals of relaxation, in which all vision is suspended. The other fishes, that are for ever staring, must see, if for no other reason, more feebly, as their organs of sight are always exerted.

As for hearing, these also are furnished with the internal instruments of the ear, although the external orifice no where appears. It is most probable that this orifice may open by some canal, resembling the Eustachian tube, into the mouth; but this has not as yet been discovered.

Yet Nature sure has not thus formed a complete apparatus for hearing, and denied the animal the use of it when formed. It is most likely that all animals of the cetaceous kind can hear, as they certainly utter sounds, and bellow to each other. This vocal power would be as needless to animals naturally deaf, as glasses to a man that was blind.

But it is in the circumstances in which they continue their kind, that these animals show an eminent superiority. Other fish deposit their spawn, and leave the success to accident; these never produce above one young, or two at the most; and this the female suckles entirely in the manner of quadrupeds, her breasts being placed, as in the human kind, above the navel. We have read many fabulous accounts of the nursing of the demigods of antiquity, of their feeding on the marrow of lions, and their being suckled by wolves: one might imagine a still more heroic system of nutrition, if we supposed that the young hero was suckled and grew strong upon the breast-milk of a she-whale!

The whale or the grampus are terrible at any time; but are fierce and desperate in the defence of their young. In Waller's beautiful poem of the Summer Islands, we have a story, founded upon fact, which shows the maternal tenderness of these animals for their offspring. A whale and her cub had got in an arm of the sea, where, by the desertion of the tide, they were inclosed

on every side. The people from shore soon saw their situation, and drove down upon them in boats, with such weapons as the urgent occasion offered. The two animals were soon wounded in several places, and the whole sea round was tinged with their blood. The whales made several attempts to escape ; and at last the old one, by its superior strength, forced over the shallow into the depths of the ocean. But though in safety herself, she could not bear the danger that awaited her young one ; she therefore rushed in once more where the smaller animal was imprisoned, and resolved, when she could not protect, at least to share its danger.—The story ends with poetical justice ; for the tide coming in, brought off both in safety from their enemies, though not without sustaining an infinite number of wounds in every part.

As to the rest, the distinctive marks of this tribe are, that the number of their fins never exceed three ; namely, two pectoral fins, and one back fin ; but in some sorts the last is wanting. These fins differ very much from those of other fishes, which are formed of straight spines : the fins of the cetaceous tribe are made up of bones and muscles ; and the skeleton of one of their fins, very much resembles the skeleton of a man's hand. Their tails also are different from those of all other fish : they are placed so as to lie flat on the surface of the water ; while the other kinds have them, as we every day see, upright or edgewise. This flat position of the tail in cetaceous animals, enables them to force themselves suddenly to the surface of the water to breathe, which they are continually constrained to do.

Of these enormous animals some are without teeth, and properly called whales : others have the teeth only in the lower jaw, and are called, by the French, cachalots : the narwhal has teeth only in the upper jaw : the dolphin's teeth as well as those of the porpoise and grampus, are both above and below. These are the marks that serve to distinguish the kinds of this enormous tribe from each other ; and these shall serve to guide us in giving their history.

CHAP. III.

OF THE WHALE PROPERLY SO CALLED, AND ITS VARIETIES.

IF we compare land animals, in respect to magnitude, with those of the deep, they will appear contemptible in the competition. It is probable, indeed, that quadrupeds once existed much larger than we find them at present. From the skeletons of some that have been dug up at different times, it is evident that there must have been terrestrial animals twice as large as the elephant ; but creatures of such an immense bulk required a proportionable extent of ground for subsistence, and, by being rivals with men for large territory, they must have been destroyed in the contest.

But it is not only upon land that man has exerted his power of destroying the larger tribes of animated nature, he has extended his efforts even into the midst of the ocean, and has cut off numbers of those enormous animals, that had perhaps existed for ages. We now no longer hear of whales two hundred, and two hundred and fifty feet long, which we are certain were often seen about two centuries ago. They have all been destroyed by the skill of mankind, and the species is now dwindled into a race of diminutive animals, from thirty to about eighty feet long.

The northern seas were once the region to which the greatest of these animals resorted ; but so great has been the slaughter of whales for more than two ages, that they begin to grow thinner every day ; and those that are now found there, seem, from their size, not to come to their full dimensions. The greatest whales resort to places where they have the least disturbance ; to those seas that are on the opposite side of the globe, near the south pole. In that part of the world there are still to be seen whales that are above a hundred and sixty feet long ; and perhaps even longer might be found in those latitudes near the south pole, to which we have not as yet ventured.

Taking the whale, however, at the ordinary size of eighty feet long and twenty feet high, what an enormous animated mass must it appear to the spectator ! With what amazement must it strike him, to behold so great a creature gamboling in the deep, with the ease and agility of the smallest animal, and making its

way with incredible swiftness ! This is a sight which is very common to those who frequent the northern or southern ocean. Yet though this be wonderful, perhaps still greater wonders are concealed in the deep, which we have not had opportunities of exploring. These large animals are obliged to show themselves in order to take breath ; but who knows the size of those that are fitted to remain for ever under water, and that have been increasing in magnitude for centuries ! To believe all that has been said of the Sea-Serpent, or the Kraken, would be credulity ; to reject the possibility of their existence, would be presumption.

The Whale is the largest animal of which we have any certain information ; and the various purposes to which, when taken, its different parts are converted, have brought us tolerably acquainted with its history. Of the whale, properly so called, there are no less than seven different kinds ; all distinguished from each other by their external figure, or internal conformation. The Great Greenland Whale, without a back-fin, and black on the back ; the Iceland Whale, without a back fin, and whitish on the back ; the New-England Whale, with a hump on the back ; the Whale with six humps on the back ; the Fin-fish, with a fin on the back near the tail ; the Pike-headed Whale, and the Round-lipped Whale. All these differ from each other in figure, as their names obviously imply. They differ also somewhat in their manner of living ; the fin-fish having a larger swallow than the rest, being more active, slender, and fierce, and living chiefly upon herrings. However, there are none of them very voracious ; and, if compared to the cachalot, that enormous tyrant of the deep, they appear harmless and gentle. The history of the rest, therefore, may be comprised under that of the Great Common Greenland Whale, with which we are best acquainted.

The Great Greenland Whale is the fish, for taking which there are such preparations made in different parts of Europe. It is a large heavy animal, and the head alone makes a third of its bulk. It is usually found from sixty to seventy feet long. The fins on each side are from five to eight feet, composed of bones and muscles, and sufficiently strong to give the great mass of body which they move, speed and activity. The tail, which lies flat on the water, is about twenty-four feet broad ; and, when

the fish lies on one side, its blows are tremendous. The skin is smooth and black, and, in some places, marbled with white and yellow ; which, running over the surface, has a very beautiful effect. This marbling is particularly observable in the fins and the tail. In the figures which are thus drawn by nature, fancy often forms the pictures of trees, landscapes, and houses. In the tail of one that was thus marbled, Ray tells us, that the number 122 was figured very evenly and exact, as if done with a pencil.

The whale makes use only of the tail to advance itself forward in the water. This serves as a great oar to push its mass along ; and it is surprising to see with what force and celerity its enormous bulk cuts through the ocean. The fins are only made use of for turning in the water, and giving a direction to the velocity impressed by the tail. The female also makes use of them when pursued, to bear off her young, clapping them on her back, and supporting them by the fins on each side from falling.

The outward or scarfskin of the whale is no thicker than parchment ; but this removed, the real skin appears, of about an inch thick, and covering the fat or blubber that lies beneath ; this is from eight to twelve inches in thickness ; and is, when the fish is in health, of a beautiful yellow. The muscles lie beneath ; and these, like the flesh of quadrupeds, are very red and tough.

The cleft of the mouth is above twenty feet along, which is near one-third of the animal's whole length ; and the upper jaw is furnished with barbs, that lie like the pipes of an organ, the greatest in the middle, and the smallest to the sides. These compose the whalebone ; the longest spars of which are found to be not less than eighteen feet ; the shortest, being of no value, are thrown away. The tongue is almost immoveably fixed to the lower jaw, seeming one great lump of fat ; and, in fact, it fills several hogsheads with blubber. The eyes are not larger than those of an ox ; and when the crystalline humour is dried, it does not appear larger than a pea. They are placed towards the back of the head, being the most convenient situation for enabling them to see both before and behind ; as also to see over them, where their food is principally found. They are guarded by eye-lids and eye-lashes, as in quadrupeds ; and they seem to be very sharp-sighted.

Nor is their sense of hearing in less perfection ; for they are warned at great distances, of any danger preparing against them. It would seem as if nature had designedly given them these advantages, as they multiply little, in order to continue their kind. It is true, indeed, that the external organ of hearing is not perceptible, for this might only embarrass them in their natural element : but as soon as the thin scarf-skin above mentioned is removed, a black spot is discovered behind the eye, and under that is the auditory canal, that leads to a regular apparatus for hearing. In short, the animal hears the smallest sounds at very great distances, and at all times, except when it is spouting water ; which is the time that the fishers approach to strike it.

These spout holes or nostrils, in all the cetaceous tribe, have been already described : in this whale there are two, one on each side the head before the eyes, and crooked, somewhat like the holes on the belly of a violin. From these holes this animal blows the water very fiercely, and with such a noise, that it roars like a hollow wind, and may be heard at three miles distance. When wounded, it then blows more fiercely than ever, so that it sounds like the roaring of the sea in a great storm.

We have already observed, that the substance called whale-bone, is taken from the upper jaw of the animal, and is very different from the real bones of the whale. The real bones are hard, like those of great land animals, are very porous, and filled with marrow. Two great strong bones sustain the upper lip, lying against each other in the shape of a half-moon : some of these are twenty feet long ; they are seen in several gardens set up against each other, and are usually mistaken for the ribs of this animal.

Such is the general conformation and figure of this great inhabitant of the deep, the precise anatomy of which has not been yet ascertained. In those places where they are caught in greatest abundance, the sailors are not very curious as to the structure of the viscera ; and few anatomists care to undertake a task where the operator, instead of separating with a lancet, must cut his way with an axe. It is as yet doubted, therefore, whether the whale, that in most points internally resembles a quadruped, may not have one great bowel fitted entirely for the reception of air, to supply it, when constrained to keep longer than usual at the bottom. The sailors universally affirm that it has ; and

philosophers have nothing but the analogy of its parts to oppose to their general assertions.

As these animals resemble quadrupeds in conformation, so they bear a strong resemblance in some of their appetites and manners. The female joins with the male, as is asserted, *more humano*, and once in two years feels the accesses of desire.

Their fidelity to each other exceeds whatever we are told of even the constancy of birds. Some fishers, as Anderson informs us, having struck one of two whales, a male and a female, that were in company together, the wounded fish made a long and terrible resistance : it struck down a boat with three men in it, with a single blow of the tail, by which all went to the bottom. The other still attended its companion, and lent it every assistance ; till, at last, the fish that was struck sunk under the number of its wounds ; while its faithful associate, disdaining to survive the loss, with great bellowing stretched itself upon the dead fish, and shared its fate.

The whale goes with young nine or ten months, and is then fatter than usual, particularly when near the time of bringing forth. It is said that the embryo, when first perceptible, is about seventeen inches long, and white ; but the cub, when excluded, is black, and about ten feet long. She generally produces one young one, and never above two. When she suckles her young, she throws herself on one side on the surface of the sea, and the young one attaches itself to the teat. The breasts are two, generally hid within the belly ; but she can produce them at pleasure, so as to stand forward a foot and a half, or two feet ; and the teats are like those of a cow. In some, the breasts are white ; in others speckled ; in all, filled with a large quantity of milk, resembling that of land animals.

Nothing can exceed the tenderness of the female for her offspring ; she carries it with her wherever she goes, and, when hardest pursued, keeps it supported between her fins. Even when wounded, she still clasps her young one ; and when she plunges to avoid danger, takes it to the bottom ; but rises sooner than usual, to give it breath again.

The young ones continue at the breast for a year, during which time they are called by the sailors, *short-heads*. They are then extremely fat, and yield above fifty barrels of blubber. The mother, at the same time, is equally lean and emaciated.

At the age of two years they are called *stunts*, as they do not thrive much immediately after quitting the breast; they then scarcely yield above twenty, or twenty-four, barrels of blubber: from that forward, they are called *skull-fish*, and their age is wholly unknown.

Every species of whale propagates only with those of its own kind, and does not at all mingle with the rest; however, they are generally seen in shoals, of different kinds together, and make their migrations in large companies, from one ocean to another. They are a gregarious animal, which implies their want of mutual defence against the invasions of smaller, but more powerful, fishes. It seems astonishing, therefore, how a shoal of these enormous animals find subsistence together, when it would seem that the supplying even one with food would require greater plenty than the ocean could furnish. To increase our wonder, we not only see them herding together, but usually find them fatter than any other animals of whatsoever element. We likewise know that they cannot swallow large fishes, as their throat is so narrow, that an animal larger than a herring could not enter. How then do they subsist and grow so fat?—A small insect, which is seen floating in those seas, and which Linnæus terms the *Medusa*, is sufficient for this supply. These insects are black, and of the size of a small bean, and are sometimes seen floating in clusters on the surface of the water. They are of a round form, like snails in a box, but they have wings, which are so tender, that it is scarcely possible to touch them without breaking. These serve rather for swimming than flying; and the little animal is called by the Icelanders, the *Walfischoas*, which signifies the whale's provender. They have the taste of raw mussels, and have the smell of burnt sugar. These are the food of the whale, which it is seen to draw up in great numbers with its huge jaws, and to bruise between its barbs, which are always found with several of these sticking among them.*

* The food of the whale is generally supposed to consist of different kinds of sepie, medusæ, or the *clio limacina* of Linnæus; but there is great reason to suppose, that it is chiefly, if not altogether, of the *squillæ* or shrimp tribe; for in examining the stomach of one of a large size, nothing else was found in it: they were about half an inch long, semi-transparent, and of a pale red colour. When the whale feeds, it swims with considerable velocity under water, with its mouth wide open; the water enters by the fore-part, but is poured out again at the sides, and the food is entangled and sifted, as it were, by the whalebone, which does not allow any thing to escape.

This is the simple food of the great Greenland whale ; it pursues no other animal, leads an inoffensive life in its element, and is harmless in proportion to its strength to do mischief. There seems to be an analogy between its manners and those of the elephant. They are both the strongest and the largest animals in their respective elements ; neither offer injury, but are terrible when provoked to resentment. The fin-fish indeed, 'in some measure, differs from the great whale in this particular, as it subsists chiefly upon herrings, great shoals of which it is often seen driving before it. Yet even the swallow of this fish is not very large, if compared to the eachalot tribe ; and its ravages are but sports in comparison. The stomach and intestines of all these animals, when opened, seldom have any thing in them, except a soft unctuous substance of a brownish colour ; and their excrements are of a shining red.

As the whale is an inoffensive animal, it is not to be wondered that it has many enemies willing to take advantage of its disposition, and inaptitude for combat. There is a small animal, of the shell-fish kind, called the *Whale-louse*, that sticks to its body, as we see shells sticking to the foul bottom of a ship.* This insinuates itself chiefly under the fins ; and whatever efforts the great animal makes, it still keeps its hold, and lives upon the fat, which it is provided with instruments to arrive at.

The sword-fish, however, is the whale's most terrible enemy. "At the sight of this little animal," says Anderson, "the whale seems agitated in an extraordinary manner ; leaping from the water as if with affright : wherever it appears, the whale perceives it at a distance, and flies from it in the opposite direction. I have been myself," continues he, "a spectator of their terrible encounter. The whale has no instrument of defence except the tail ; with that it endeavours to strike the enemy ; and a single blow taking place, would effectually destroy its adversary : but the sword-fish is as active as the other is strong, and easily avoids the stroke ; then bounding into the air, it falls upon its great subjacent enemy, and endeavours not to pierce with its pointed beak, but to cut it with its toothed edges. The sea all about is seen dyed with blood, proceeding from the wounds of the whale ; while the enormous animal vainly endeavours to reach its invader, and strikes with its tail against the surface of the

* This is the *Lepus Diadema*, or crown-shaped acorn shell of Linnaeus.

water, making a report at each blow louder than the noise of a cannon."

There is still another and more powerful enemy, called by the fishermen of New-England, *the Killer*. This is itself a cetaceous animal, armed with strong and powerful teeth. A number of these are said to surround the whale, in the same manner as dogs get round a bull. Some attack it with their teeth behind; others attempt it before, until at last the great animal is torn down, and its tongue is said to be the only part they devour when they have made it their prey. They are said to be of such great strength, that one of them alone was known to stop a dead whale that several boats were towing along, and drag it from among them to the bottom.

But of all the enemies of these enormous fishes, man is the greatest: he alone destroys more in a year than the rest in an age, and actually has thinned their numbers in that part of the world where they are chiefly sought. The great resort of these animals was found to be on the inhospitable shores of Spitzbergen; where the distance of the voyage, the coldness of the climate, the terrors of the icy sea, and, still more, their own formidable bulk, might have been expected to protect them from human injury. But all these were but slight barriers against man's arts, his courage, and his necessities. The European ships, soon after the improvement of navigation, found the way into those seas; and as early as the beginning of the fourteenth century, the Biscayneers were in possession of a very considerable trade to the coast of Greenland. The Dutch and the English followed them thither, and soon took that branch of commerce out of their hands. The English commenced the business about the beginning of the seventeenth century; and the town of Hull had the honour of first attempting that profitable branch of trade.* But, at present, it seems upon the decline, as the quan-

* The following account of the Irish Whale Fishery during the last century may be acceptable. The Fishery eventually failed, but it is worthy of consideration whether a revival of it, under an improved state of Irish trade and commerce, might not be beneficial. In the year 1736, a certain lieutenant of the name of Chaplin, quartered at Gibraltar, and who had been formerly employed in the Greenland fishery, was informed by Captain Nesbit, who was also quartered in that garrison, that in the spring of the year many whales frequented the north-west coast of Ireland, from Tyland-head, in the county of Donegal, to the bay of Sligo. Chaplin, being an enterprising

tity of fish is so greatly reduced, by the constant capture for such a vast length of time. It is now said that the fishers, from a defect of whales, apply themselves to the seal-fishery; yet, as these animals are extremely timorous, they will soon be induced

man, sold his commission soon after he had received this information, and came to Ireland with a view to fish for these whales. He accordingly procured two boats to be made, upon the model of those used in the Greenland seas, and furnished himself with harpoons and other instruments; but he was able to kill only two whales in eight years. As then whales were in great plenty on the coast, he imputed his bad success to the want of a better apparatus, which not being able to purchase, he applied to parliament for aid, and obtained a grant of 500*l.*; but dying before he received it, it was never issued. After his death, his brother pursued his project, with no better success, for eight years more, during which time he also killed two whales, and then died.

In the year 1759, Messrs Thomas and Andrew Nesbit, who lived near Killibegs, on the sea-coast of the county of Donegal, and who were very skilful in the herring and whale fisheries carried on there, seeing whales in great numbers, revived Chaplin's undertaking, and took for granted that he miscarried either for want of money, or perseverance. In this project they engaged Messrs Benson and Irwin, gentlemen of credit and property, and procured a ship to be fitted up in the Greenland fashion, with five boats of a new construction: they also procured harpooners, and other persons experienced in the Greenland fishery, and in the year 1760 they began to fish; but though they saw many whales, they were able to kill none. Mr Thomas Nesbit afterwards killed one large whale with his own hand; and as there was no manufactory for the bone or blubber in Ireland, he sent it to London. After procuring some alterations and improvements to be made in his ship, he made another attempt, with five of the ablest and most skilful harpooners he could get, and eight boats, extremely well provided: yet not a single whale was killed that season, though great plenty were seen, and opportunities of striking them often offered.

At length the company having expended 3000*l.* in the undertaking, it was discovered that the method of fishing and harpooning in Greenland would not answer in these seas, because that in Greenland, the waters being always calm, the boats are not agitated, so that the harpooner is more sure of his stroke, and the whale frequently bends his head downwards, in order to plunge under water, which the fishers call backing, and which straining or tightening the skin, the harpooner seizes that instant to strike, and the harpoon enters deeply, which it would not do if the skin hung loose over the blubber.—In the Irish seas, on the contrary, or at least off Donegal, the water is always rough, either by a wind or a swell, so that the harpooner can take no aim, and the whale seldom backing (bending his back), but lying extended on the water, with the skin loose and flaccid over the fat, the harpoon, though it may reach him with considerable force, does not enter. Mr Nesbit, therefore, in order to give force to the harpoon, and also to the lances, which are discharged at the fish every time he rises after the harpoon has entered, contrived to discharge both the harpoon and the lance from a swivel-gun, which succeeded so well, that in the year 1762 the company

to quit those shores, where they meet such frequent disturbance and danger. The poor natives of Greenland themselves, who used to feed upon the whale, are diminishing, in proportion as their sustenance is removed; and it is probable that the revolution of a few years will see that extensive coast totally deserted by its inhabitants, as it is already nearly deserted by the whales.

The art of taking whales, like most others, is much improved by time, and differs in many respects from that practised by the Biscayneers, when they first frequented the icy sea. But as the description of their method is the least complicated, and consequently the easiest understood, it will be best suited to our purpose.*

killed three whales, two of which were between sixty and seventy feet long, and the other above fifty; and in 1763, they have killed two whales of a large size, which is more than many have done that have been fitted out for Greenland, at a vast expense.

It is to be observed, that in the sea off the coast of Donegal, there are, besides the whales that yield only bone and blubber, the train-fish, the porpoise, the sun-fish, and the spermaceti-whale, besides seals in abundance. The teeth of the spermaceti-whale are shaped like a cucumber, and are about eighteen inches long; they are as white as ivory, take a fine polish, and make very beautiful and durable handles for knives, &c. The sun-fish is valuable for the oil that is extracted from the liver, each fish yielding about a ton: they are found all the year, and are taken with great ease: the other fish and the seals are of little value.

* We here extract from the first No. of the Edinburgh Cabinet Library the following account of the Northern Whale Fishery. "The first object is to fit out a ship suited to the trade. While the fishery was carried on in bays, or on the exterior margin of icy fields, very slight fabrics were sufficient; but now that the vessels depart early in the season, and push into the very heart of the northern ices, they are liable every moment to the most severe shocks and concussions. The ship, therefore, must be constructed in such a manner as to possess a peculiar degree of strength. Its exposed parts are secured with double or even treble timbers, while it is *fortified*, as the expression is, externally with iron plates, and internally with stanchions and cross-bars, so disposed as to cause the pressure on any one part to bear upon and be supported by the whole fabric. Mr Scoresby recommends the dimension of 350 tons as the most eligible. A ship of this size is sometimes filled; and the number of men required for its navigation, being also necessary for manning the boats employed in the fishery, could not be reduced even in a much smaller vessel. A larger tonnage than 350, being scarcely ever filled, involves the proprietor in useless extra expense. The Dutch are of opinion, that the vessels destined for this fishery should be 112 feet long, 29 broad, and 12 deep, carrying seven boats, and from 40 to 50 seamen. One of the most essential particulars is the crow's nest, a species of sentry-box made of canvass or light wood, pitched on the main-top-mast, or top-gallant-mast head. This is the post of honour, and also of

For this navigation, the Biscayneers, in favourable seasons, fitted out thirty ships, of two hundred and fifty tons each, with fifty choice men apiece, and a few boys. These were stored with six months' provision ; and each ship had its boats, which

severe cold, where the master often sits for hours in a temperature thirty or forty degrees below the freezing-point, and whence he can desery all the movements of the surrounding seas and ice, and give directions accordingly. He is provided with a telescope, a speaking-trumpet, and a rifle, with which he can sometimes strike a narwal, as it floats around the ship.

The whaling vessels usually take their departure in such time as to leave the Shetland Isles about the beginning of April ; and before the end of the month arrive within the polar seas. It was long customary to spend a few weeks at what is called the Seal-fishers' Bight, extending along the coast of Greenland, ere they pushed into those more northern waters, where, amid fields and mountains of ice, the powerful and precious *mysticetus* is tossing ; but in later times it has become usual to sail at once into that centre of danger and enterprise.

As soon as they have arrived in those seas which are the haunt of the whale, the crew must be every moment on the alert, keeping watch day and night. The seven boats are kept hanging by the sides of the ship, ready to be launched in a few minutes ; and, where the state of the sea admits, one of them is usually manned and afloat. These boats are from 25 to 28 feet long, about 5½ feet broad, and constructed with a special view to lightness, buoyancy, and easy steerage. The captain or some principal officer, seated in the crew's nest, surveys the waters to a great distance, and the instant he sees the back of the huge animal, which they seek to attack, emerging from the waves, gives notice to the watch who are stationed on deck ; part of whom leap into a boat, which is instantly lowered down, and followed by a second, if the fish be a large one. Each of the boats has a harpooner, and one or two subordinate officers, and is provided with an immense quantity of rope coiled together, and stowed in different quarters of it, the several parts being spliced together, so as to form a continued line, usually exceeding 4000 feet in length. To the end is attached the harpoon, an instrument formed, not to pierce and kill the animal, but, by entering and remaining fixed in the body, to prevent its escape. One of the boats is now rowed towards the whale in the deepest silence, cautiously avoiding to give an alarm, of which he is very susceptible. Sometimes a circuitous route is adopted, in order to attack him from behind. Having approached as near as is consistent with safety ; the harpooner darts his instrument into the back of the monster. This is a critical moment ; for when this mighty animal feels himself struck, he often throws himself into violent convulsive movements, vibrating in the air his tremendous tail, one lash of which is sufficient to dash a boat in pieces. More commonly, however, he plunges with rapid flight into the depths of the sea, or beneath the thickest fields and mountains of ice. While he is thus moving at the rate usually of eight or ten miles an hour, the utmost diligence must be used that the line to which the harpoon is attached may run off smoothly and readily along with him. Should it be entangled for a moment, the strength of the whale is such, that he would draw the boat and crew after him under the waves.

were to be serviceable when come to the place of duty. When arrived at the part where the whales are expected to pass to the southward, they always keep their sails set, and a sailor is placed at the mast-head, to give information when he spies a whale. As

The first boat ought to be quickly followed up by a second, to supply more line when the first is run out, which often takes place in eight or ten minutes. When the crew of a boat see the line in danger of being all run off, they hold up one, two, or three oars, to intimate their pressing need of supply. At the same time they turn the rope once or twice round a kind of post called the bollard, by which the motion of the line and the career of the animal are somewhat retarded. This, however, is a delicate operation, which brings the side of the boat down to the very edge of the water, and if the rope is drawn at all too tight, may sink it altogether. While the line is whirling round the bollard, the friction is so violent, that the harpooner is enveloped in smoke, and water must be constantly poured on to prevent it from catching fire. When, after all, no aid arrives, and the crew find that the line must run out, they have only one resource,—they cut it, losing thereby not only the whale, but the harpoon and all the ropes of the boat.

When the whale is first struck and plunges into the waves, the boat's crew elevate a flag as a signal to the watch on deck, who give the alarm to those asleep below, by stamping violently on the deck, and crying aloud—“*A fall, a fall!*” (Dutch, *val*, expressing the precipitate haste with which the sailors throw themselves into the boats.) On this notice, they do not allow themselves time to dress, but rush out in their sleeping-shirts or drawers into an atmosphere, the temperature of which is often below zero, carrying along with them their clothing in a bundle, and trusting to make their toilette in the interval of manning and pushing off the boats. Such is the tumult at this moment, that young mariners have been known to raise cries of fear, thinking the ship was going down.

The period during which a wounded whale remains under water is various, but is averaged by Mr Scoresby at about half an hour. Then, pressed by the necessity of respiration, he appears above, often considerably distant from the spot where he was harpooned, and in a state of great exhaustion, which the same ingenious writer ascribes to the severe pressure that he has endured when placed beneath a column of water 700 or 800 fathoms deep. All the boats have meantime been spreading themselves in various directions, that one at least may be within a *start*, as it is called, or about 200 yards of the point of his rising, at which distance they can easily reach and pierce him with one or two more harpoons before he again descends, as he usually does for a few minutes. On his reappearance a general attack is made with lances, which are struck as deep as possible, to reach and penetrate the vital parts. Blood mixed with oil streams copiously from his wounds and from the blow-holes, dyeing the sea to a great distance, and sprinkling and sometimes drenching the boats and crews. The animal now becomes more and more exhausted; but at the approach of his dissolution, he often makes a convulsive and energetic struggle, rearing his tail high in the air, and whirling it with a noise which is heard at the distance of several miles. At length, quite overpowered and exhausted, he lays himself on his side or back, and expires. The flag is then taken down, and three loud

soon as he discovers one, the whole crew are instantly in employment: they fit out their boats and row away to where the whale was seen. The harpooner, who is to strike the fish, stands at the prow of the boat, with a harpoon or javelin in his hand, five or six feet long, pointed with steel like the barb of an arrow, of a triangular shape. As this person's place is that of the greatest dexterity, so also it is of the greatest danger: the whale sometimes overturns the boat with a blow of its tail; or drives against it with fury. In general, however, the animal seems to sleep on the surface of the water: while the boat is approaching, the harpooner stands aloft, and with his harpoon tied to a cord of several hundred fathom length, darts it into the animal, and then rows as fast as possible away. It is some time before the whale seems to feel the blow; the instrument has usually pierced no deeper than the fat, and that being insensible, the animal continues for a while motionless; but soon roused from its seeming lethargy, as the shaft continues to pierce deeper and deeper into the muscular flesh, it flies off with amazing rapidity. In the meantime, the harpoon sticks in its side, while the rope, which is coiled up in the boat, and runs upon a swivel, lengthens as the whale recedes, but still shows the part of the deep to which it has retreated. The cord is coiled up with great care; for such is the rapidity with which it runs off, that if it was but the least checked, as it yields with the animal's retreat, it would infallibly upset the boat, and the crew would go to the bottom. It sometimes happens also, that the rapidity with which it runs over the swivel at the edge of the boat, heats it, and it would infallibly take fire, did not a man stand continually with a wet mop in his hand, to cool the swivel as the cord runs.* The whale having dived to a considerable depth, remains at the bottom, sometimes for near half an hour, with the harpoon in its body, and then rises to take breath, expecting the danger over; but the instant it appears, they are all with their boats ready to receive it, and fling the harpoons into its body; the animal again dives and again rises, while they repeat their blows. The ship fol-

luzzas raised from the surrounding boats. No time is lost in piercing the tail with two holes, through which ropes are passed, which being fastened to the boats, drag the fish to the vessel amid shouts of joy.

* It is also customary to have a man stationed with an axe, ready to cut the rope asunder should it become entangled.

lows in full sail, like all the rest, never losing sight of the boats, and ready to lend them assistance ; the whole ocean seems dyed in blood. Thus they renew their attacks, till the whale begins to be quite enfeebled and spent, when they plunge their longer spears into various parts of its body, and the enormous animal expires.* When it is dead, to prevent it from sinking, they tie it with a strong iron chain to the side of the boat, and either cut it up in pieces, and carry it home in that manner, or extract the oil from the blubber on ship-board.

Such is the manner in which these fish were taken in the beginning ; but succeeding arts have improved the method, and the harpoon is now thrown by ; a machine being used which inflicts a deeper wound, and strikes the animal with much greater cer-

* The extreme fidelity of these wonderful animals towards each other, and their affection for their offspring, is almost incredible. So fondly attached are they to the society of their brethren, that many instances are recorded of their assuming a passive floating position, on the surface, after offering much resistance ; as though disdaining to survive the loss of their companions. Thus, when the Cyrus had captured six, out of a herd of seven whales, and they were supported around the vessel on the water, the surviving one rose, and thrust its head amongst its dead brethren, and remained immoveable, close to the vessel, while it was killed. In general, the female is accompanied in her progress by her young one, though, on the contrary, she sometimes wanders very far from it ; and yet, by some unknown impulse, highly calculated to excite our amazement, she has no difficulty in finding it, though perfectly silent, in the vast and trackless ocean, as often as she requires ; and the same may be said of all the cetacea. But further, when her young one is hardest pursued and harpooned, she supports it under her fin, while she plunges with it for safety into unfathomable depths. A young whale, having been struck by a harpoon from a Hull vessel, being at the time at some distance from its mother, had run out some length of line, when the latter appeared in sight, and rapidly bent her course towards it. In vain did she use every usual means to induce it to leave the place of danger, while swimming by its side, as far as the line would allow, in circles around the boats, during the space of four hours ; and within this time, on four separate occasions, the parent was observed, when on the surface, to throw one of her fins over the body of the young whale, and to endeavour to drag it away by all the force she possessed ; she, lastly, in this way set off with it in a straight direction, carrying away additional line, to the extent of seven hundred and twenty fathoms ; but, by that time, the young one became so much exhausted from loss of blood, that she necessarily abandoned it to its fate, and herself escaped, by pursuing her progress towards the ice, roaring and spouting with great vehemence ; for when a whale is struck with a harpoon, or is enraged by the loss of its young, it ejects the water through its spiracles with great force, producing a stridulous kind of roaring, which may be heard the distance of a mile.

tainty : there are better methods for extracting oil, and proper machines for cutting the animal up, than were used in the early fisheries. But as an account of this belongs to the history of art, and not of nature, we must be contented with observing, that several parts of this animal, and all but the intestines and the bones, are turned to a very good account ; not only the oil, but the greaves from which it is separated. The barbs also were an article of great profit ; but have sunk in their price, since women no longer use them to swell out their petticoats with whalebone.* The flesh of this animal is also a dainty to some nations,

* The Greenland whale affords to us a sublime instance of contrivance, compensating its total want of teeth, in the hundreds of plates of whalebone, which cover the roof of its mouth ; and which, by their growth, increasing in length and in breadth, often acquire twelve feet in length, and fifteen inches broad. There have, indeed, been some instances in which whalebone has attained fifteen feet in length ; since those whales, which afford whalebone of twelve feet, are themselves often more than sixty feet in length. The upper surface of the skull of a whale of this size, measured twenty feet eight inches long ; and the creature itself weighed upwards of a hundred tons. The roots of the two sides of the arch of whalebone, in the mouth of this animal, nearly meet at the top of the roof whence they grow, at the anterior part of the mouth ; but they gradually recede from each other, as they are continued backwards, till they approach the throat, when they again approximate. This substance, called whalebone, which thus supplies the place of teeth, consists of a peculiar kind of horn. Its plates differ in their length and strength, in different parts of the mouth, but the outer row of plates are by far the strongest and the longest, especially those which are mid-way between the throat and the snout. As the fibres of every plate are loose and separate at its inferior edge, forming a deep pendent fringe, by the gradual splitting away of its substance in proportion as it is used, the entire vaulted sides of the roof of the mouth, in fact, by these means, is deeply lined with a clothing of thick and coarse hair, whence the ancients gave to this species of whale the name of mysticetus. Beneath this vault of hair, lies the enormous tongue of the whale, and exterior to it, is the immensely high lower lip, which, when the jaws are closed, shuts up over all externally to the very origin of the whalebone above, so as to entirely conceal it from view. By means also of this formation of the lip, and the circumstance of the upper jaw shutting into a cartilaginous grove at the extremity of the lower one, the most perfect valve is formed, which any pressure from without, only tends to render more secure from the ingress of the water. The fringe produced by the whalebone (as it is constantly and gradually extending itself in length, by the growth of the whalebone behind it, in proportion as it is worn away), is thus always in a proper state of adaptation to the marvellous economy of the creature ; for the most curious part of this beautiful mechanism is the net or sieve which it thus forms ; an instrument which has been granted to this largest of creatures, for the purpose of straining or separating its minute prey from the water necessarily

and even the French seamen are now and then found to dress and use it as their ordinary diet at sea. It is said, by the English and Dutch sailors, to be hard and ill-tasted ; but the French assert the contrary ; and the savages of Greenland, as well as those near the south pole, are fond of it to distraction. They eat the flesh, and drink the oil, which is a first-rate delicacy. The finding a dead whale is an adventure considered among the fortunate circumstances of their wretched lives. They make their abode beside it ; and seldom remove till they have left nothing but the bones.

Jacobson, whom we quoted before in the History of Birds, where he described his countrymen of the island of Feroe as living a part of the year upon salted gulls, tells us also, that they are very fond of salted whale's flesh. The fat of the head they season with bay salt, and then hang it up to dry in the chimney. He thinks it tastes as well as fat bacon ; and the lean, which they boil, is, in his opinion, not inferior to beef. I fancy poor Jacobson would make but an indifferent taster at one of our city feasts !

CHAP. IV.

OF THE NARWHAL.

FROM whales that entirely want teeth, we come to such as have them in the upper jaw only ; and in this class is found but one, the Narwhal, or Sea-unicorn. This fish is not so large as the whale, not being above sixty feet long. Its body is slenderer than that of the whale, and its fat not in so great abundance. But this great animal is sufficiently distinguished from all others of the deep by its tooth or teeth, which stand pointing directly forward from the upper jaw, and are from nine to fourteen feet

taken into the mouth with it, in feeding. For, in this whale, the mouth is of such enormous proportions, as to receive at once even tons of water, and yet of such wonderful perfection is its filtering mechanism through these hair-like filaments, that it rarely allows the escape of the nourishing particles diffused therein, although they be no larger than peas ; its food consisting chiefly of small medusæ, crustacea, and zoophytes.

long. In all the variety of weapons with which Nature has armed her various tribes, there is not one so large or so formidable as this. This terrible weapon is generally found single, and some are of opinion that the animal is furnished but with one by nature ; but there is at present the skull of a narwhal at the Stadthouse at Amsterdam, with two teeth ; which plainly proves that in some animals, at least, this instrument is double. It is even a doubt whether it may not be so in all ; and that the narwhal's wanting a tooth is only an accident which it has met with in the encounters it is obliged daily to be engaged in. Yet it must be owned, of those that are taken only with one tooth, there seems no socket, nor no remains of any other upon the opposite side of the jaw, but all is plain and even. However this be, the tooth, or, as some are pleased to call it, the horn of the narwhal, is the most terrible of all natural instruments of destruction. It is as straight as an arrow, about the thickness of the small of a man's leg, wreathed in the manner we sometimes see twisted bars of iron ; it tapers to a sharp point ; and is whiter, heavier and harder, than ivory. It is generally seen to spring from the left side of the head directly forward in a straight line with the body ; and its root enters into the socket above a foot and a half. In a skull to be seen at Hamburg there are two teeth, which are each above seven feet long, and are eight inches in circumference. When the animal, possessed of these formidable weapons, is urged to employ them, it drives directly forward against the enemy with its teeth, that, like protended spears, pierce whatever stands before them.

The extreme length of these instruments has induced some to consider them rather as horns than teeth ; but they in every respect resemble the tusks of the boar and the elephant. They grow, as in them, from sockets in the upper jaw ; they have the solidity of the hardest bone, and far surpass ivory in all its qualities. The same error has led others to suppose, that as among quadrupeds the female was often found without horns, so these instruments of defence were only to be found in the male : but this has been more than once refuted by actual experience ; both sexes are found armed in this manner ; the horn is sometimes found wreathed, and sometimes smooth ; sometimes a little bent, and sometimes straight ; but always strong, deeply fixed, and sharply pointed.

Yet, notwithstanding all these appointments for combat, these long and pointed tusks, amazing strength, and unmatchable celerity, the narwhal is one of the most harmless and peaceful inhabitants of the ocean. It is seen constantly and inoffensively sporting among the other great monsters of the deep, no way attempting to injure them, but pleased in their company. The Greenlanders call the narwhal the forerunner of the whale; for wherever it is seen, the whale is shortly after sure to follow. This may arise as well from the natural passion for society in these animals, as from both living upon the same food, which are the insects described in the preceding chapter. These powerful fishes make war upon no other living creature; and though furnished with instruments to spread general destruction, are as innocent and as peaceful as a drove of oxen. Nay, so regardless are they of their own weapons, and so utterly unmindful to keep them in repair for engagement, that they are constantly seen covered over with weeds, slough, and all the filth of the sea; they seem rather considered as an impediment than a defence.

The manners and appetites both of the narwhal and the great whale are entirely similar; they both alike want teeth for chewing, and are obliged to live upon insects; they both are peaceable and harmless, and always rather fly than seek the combat. The narwhal, however, has a much narrower gape than the great whale, and, therefore, does not want the use of barbs to keep in its food when once sucked into the mouth. It is also much swifter, and would never be taken by the fishermen but for those very tusks which at first appear to be its principal defence. These animals, as was said, being fond of living together, are always seen in herds of several at a time; and whenever they are attacked they crowd together in such a manner, that they are mutually embarrassed by their tusks. By these they are often locked together, and are prevented from sinking to the bottom. It seldom happens, therefore, but the fishermen make sure of one or two of the hindmost, which very well reward their trouble.*

* The blubber of the narwhal produces very fine oil; but it is chiefly hunted for its tusk, which forms ivory of a quality superior to that of the elephant.

It is from the extraordinary circumstance of the teeth, therefore, that this fish demands a distinct history; and such has been the curiosity of mankind, and their desire to procure them, that a century ago they were considered as the greatest rarity in the world. At that time the art of catching whales was not known; and mankind saw few, except such as were stranded on the coasts by accident. The tooth of the narwhal, therefore, was ascribed to a very different animal from that which really bore it. Among other fossil substances, they were sometimes dug up; and the narwhal being utterly unknown, naturalists soon found a terrestrial owner. They were thought to be the horns of unicorns, an animal described by Pliny as resembling a horse, and with one straight horn darting forward from the middle of its forehead. These teeth were, therefore, considered as a strong testimony in favour of that historian's veracity, and were shown among the most precious remains of antiquity. Even for some time after the narwhal was known, the deceit was continued, as those who were possessed of a tooth sold it to great advantage. But at present they are too well known to deceive any, and are only shown for what they really are; their curiosity increasing in proportion to their weight and size.*

CHAP. V.

OF THE CACHALOT, AND ITS VARIETIES.

THE Cachalot which has generally gone under the name of the spermaceti-whale, till Mr Pennant very properly made the distinction, by borrowing its name from the French, has several teeth in the under jaw, but none in the upper. As there are no less than seven distinctions among whales, so also there are the same number of distinctions in the tribe we are describing. The cachalot with two fins and a black back; the cacholet with two

* A species is mentioned by Fabricius, as being found on the shores of Greenland, much smaller, of a black colour, with two obtuse teeth from the upper jaw, a little curved at the tips, very weak, and measuring not above an inch in length: it has likewise a small fin on the back, which is wanting in the common Narwhal.

fins and a whitish back ; that with a spout in the neck ; that with a spout in the snout ; that with three fins and sharp-pointed teeth ; that with three fins and sharp-edged teeth ; and, lastly, the cachalot, with three fins and flatted teeth.

This tribe is not of such enormous size as the whale, properly so called, not being above sixty feet long, and sixteen feet high. In consequence of their being more slender, they are much more active than the common whale ; they remain a longer time at the bottom ; and afford a smaller quantity of oil. As in the common whale the head was seen to make a third part of its bulk, so in this species the head is so large as to make one half of the whole. The tongue of this animal is small, but the throat is very formidable ; and with very great ease it could swallow an ox. In the stomach of the whale scarcely any thing is to be found ; but in that of the cachalot there are loads of fish of different kinds ; some whole, some half digested, some small, and others eight or nine feet long. The cachalot is, therefore, as destructive among lesser fishes, as the whale is harmless ; and can at one gulp swallow a shoal of fishes down its enormous gullet.—Linnæus tells us that this fish pursues and terrifies the dolphins and porpoises so much, as often to drive them on shore.

But, how formidable soever this fish may be to its fellows of the deep, it is by far the most valuable, and the most sought after by man, as it contains two very precious drugs, spermaceti and ambergris. The use of these, either for the purposes of luxury or medicine, is so universal, that the capture of this animal, that alone supplies them, turns out to very great advantage, particularly since the art has been found out of converting all the oil of this animal, as well as the brain, into that substance called spermaceti.

This substance, as it is naturally formed, is found in the head of the animal, and is no other than the brain. The outward skin of the head being taken off, a covering of fat offers about three inches thick ; and under that, instead of a bony skull, the animal has only another thick skin that serves for a covering and defence of the brain. The first cavity or chamber of the brain, is filled with that spermaceti which is supposed of the greatest purity and highest value. From this cavity there is generally drawn about seven barrels of the clearest spermaceti, that thrown upon water coagulates like cheese. Below this there is another

chamber just over the gullet, which is about seven feet high ; and this also contains the drug, but of less value. It is distributed in this cavity like honey in a hive, in small cells, separated from each other by a membrane like the inner skin of an egg. In proportion as the oily substance is drawn away from this part, it fills anew from every part of the body ; and from this is generally obtained about nine barrels of oil. Besides this, the spinal-marrow, which is as thick as a man's thigh, and reaches all along the back-bone to the tail, where it is not thicker than one's finger, affords no inconsiderable quantity.*

This substance, which is used in the composition of many medicines, rather to give them consistence than efficacy, was at first sold at a very high price, both from the many virtues ascribed to it, and the small quantity that the cachalot was capable of supplying : at present, the price is greatly fallen ; first, because its efficacy in medicine is found to be very small : and again, because the whole oil of the fish is easily convertible into spermaceti. This is performed by boiling it with a ley of potash, and hardening it in the manner of soap. Candles are now made of it, which are substituted for wax, and sold much cheaper ; so that we need not fear having our spermaceti adulterated in the manner some medical books caution us to beware of ; for they carefully guard us against having our spermaceti adulterated with virgin wax.

As to the ambergris, which is sometimes found in this whale, it was long considered as a substance found floating on the surface of the sea ; but time, that reveals the secrets of the mercenary, has discovered that it chiefly belongs to this animal. The name, which has been improperly given to the former substance, seems more justly to belong to this ; for the ambergris is found in the place where the seminal vessels are usually situated in other animals. It is found in a bag of three or four feet long, in round lumps from one to twenty pounds weight, floating in a

* The perfume called Ambergris, is found in large masses in the intestines, and is now known to be nothing more than the excrements of the animal. Spermaceti is found in a vast cavity in the upper part of the head : while fresh, and in its natural receptacle, it is nearly fluid ; but it concretes into opaque masses soon after it is exposed to the air. Spermaceti whales are found most abundantly in the Southern Atlantic and Pacific Oceans, on the coasts of New Holland, and in the Antarctic regions. They have also been observed in the Mediterranean and British Seas.

fluid rather thinner than oil, and of a yellowish colour. There are never seen more than four at a time in one of these bags ; and that which weighed twenty pounds, and which was the largest ever seen, was found single. These balls of ambergris are not found in all fishes of this kind, but chiefly in the oldest and strongest. The uses of this medicine for the purposes of luxury, and as a perfume, are well known ; though upon some subjects ignorance is preferable to information.

CHAP. VI.

OF THE DOLPHIN, THE GRAMPUS, AND THE PORPOISE, WITH THEIR VARIETIES.

ALL these fish have teeth both in the upper and the lower jaw, and are much less than the whale. The Grampus, which is the largest, never exceeds twenty feet.* It may also be distinguished by the flatness of its head, which resembles a boat turned upside down. The Porpoise resembles the grampus in most things except the snout, which is not above eight feet long ; its snout also more resembles that of a hog. The Dolphin has a strong resemblance to the porpoise, except that its snout is longer, and more pointed. They have all fins on the back ; they all have heads very large, like the rest of the whale-kind ; and resemble each other in their appetites, their manners, and conformations ; being equally voracious, active, and roving.†

* The Gladiator or Sea-sword, a formidable enemy to the Greenland whale, has often been confounded with the Grampus. The grampus has the top of the head rather flat, the snout less obtuse, the upper jaw longer than the lower, while in the gladiator both are of equal length. The teeth of the grampus are blunt, and the dorsal fin placed about the middle of the back, and proportionally not so long as in the gladiator. Indeed it is from the remarkable length and firmness of this fin in the gladiator, that it has received the name of sea-sword.

† The Dolphin tribe of cetaceous fishes comprehends about 13 species, 11 with the dorsal fin, and the others without. *Saosao* is the name which the Bengalese about Calcutta give to a species of dolphin found in the Ganges, especially in the slow-moving labyrinth of rivers and creeks which intersect the Delta of that river to the south, S. E. and E. of Calcutta. The description of this new species we owe to Dr Roxburgh, who distinguishes it by

The great agility of these animals prevents their often being taken. They seldom remain a moment above water; sometimes, indeed, their too eager pursuits expose them to danger; and a shoal of herrings often allures them out of their depth. In such a case, the hungry animal continues to flounder in the shallows till knocked on the head, or till the returning tide seasonably comes to its relief. But all this tribe, and the dolphin in particular, are not less swift than destructive. No fish could escape them, but from the awkward position of the mouth, which is placed in a manner under the head: yet, even with these disadvantages, their depredations are so great, that they have been justly styled the plunderers of the deep.

What could induce the ancients to a predilection in favour of these animals, particularly the dolphin, it is not easy to account for. Historians and philosophers seem to have contended who should invent the greatest number of fables concerning them. The dolphin was celebrated in the earliest time for its fondness to the human race, and was distinguished by the epithets of the boy-loving and philanthropist. Scarcely an accident could happen at sea, but the dolphin offered himself to convey the unfortunate to shore. The musician flung into the sea by pirates, the boy taking an airing in the midst of the sea, and returning again in safety, were obliged to the dolphin for its services. It is not easy, I say, to assign a cause why the ancients should thus have invented so many fables in their favour. The figure of these animals is far from prejudicing us in their interest; their extreme rapacity tends still less to endear them; I know nothing that can reconcile them to man and excite his prejudices, except that when taken they sometimes have a plaintive moan, with which they continue to express their pain till they expire. This, at first, might have excited human pity; and that

the name of *Delphinus Gangeticus*. Its body (including the head) is long and slender, thickest about the fore-part, and from thence tapering to the tail; from the anus forward nearly round. The skin is soft, smooth, and of a shining pearl-gray when dry, with here and there light-coloured spots or clouds, particularly when old. When the animal is alive, and seen in the act of rising to breathe, it appears much darker. The length of the individual which Dr Roxburgh examined (and which was young, little more than half grown,) was six and a half feet, and at the thickest part, which is rather behind the pectoral fins, three feet in circumference. The weight 120 pounds.

might have produced affection. At present, these fishes are regarded even by the vulgar in a very different light; their appearance is far from being esteemed a favourable omen by the seamen; and from their boundings, springs, and frolics in the water, experience has taught the mariners to prepare for a storm.

But it is not to one circumstance only that the ancients have confined their fabulous reports concerning these animals; as from their leaps out of their element, they assume a temporary curvature, which is by no means their natural figure in the water, the old painters and sculptors have universally drawn them wrong. A dolphin is scarcely ever exhibited by the ancients in a straight shape, but curved, in the position which they sometimes appear as when exerting their force; and the poets too have adopted the general error. Even Pliny, the best naturalist, has asserted, that they instantly die when taken out of the water; but Rondelet, on the contrary, assures us that he has seen a dolphin carried alive from Montpellier to Lyons.

The moderns have more just notions of these animals; and have got over the many fables, which every day's experience contradicts. Indeed their numbers are so great, and, though shy, they are so often taken, that such peculiarities, if they were possessed of any, would have been long since ascertained. They are found, the porpoise especially, in such vast numbers, in all parts of the sea that surrounds this kingdom, that they are sometimes noxious to seamen, when they sail in small vessels. In some places they almost darken the water as they rise to take breath, and particularly before bad weather, are much agitated, swimming against the wind, and tumbling about with unusual violence.

Whether these motions be the gambols of pleasure or the agitations of terror, is not well known. It is most probable that they dread those seasons of turbulence, when the lesser fishes shrink to the bottom, and their prey no longer offers in such abundance. In times of fairer weather they are seen herding together, and pursuing shoals of various fish with great impetuosity. Their method of hunting their game, if it may be so called, is to follow in a pack, and thus give each other mutual assistance. At that season, when the mackarel, the herring, the salmon, and other fish of passage, begin to make their appearance, the ceta-

ceous tribes are seen fierce in the pursuit ; urging their prey from one creek or bay to another, deterring them from the shallows, driving them towards each other's ambush, and using a greater variety of arts than hounds are seen to exert in pursuing the hare. However, the porpoise not only seeks for prey near the surface, but often descends to the bottom in search of sand-eels, and sea-worms, which it roots out of the sand with its nose, in the manner hogs harrow up the fields for food. For this purpose, the nose projects a little, is shorter and stronger than that of the dolphin ; and the neck is furnished with very strong muscles, which enable it the readier to turn up the sand.

But it sometimes happens, that the impetuosity, or the hunger, of these animals, in their usual pursuits, urges them beyond the limits of safety. The fishermen, who extend their long nets for pilchards, on the coasts of Cornwall, have sometimes an unwelcome capture in one of these.—Their feeble nets, which are calculated only for taking smaller prey, suffer a universal laceration from the efforts of this strong animal to escape ; and if it be not knocked on the head, before it has had time to flounder, the nets are destroyed, and the fishery interrupted. There is nothing, therefore, they so much dread, as the entangling a porpoise ; and they do every thing to intimidate the animal from approaching.*

Indeed, these creatures are so violent in the pursuit of their prey, that they sometimes follow a shoal of small fishes up a fresh-water river, from whence they find no small difficulty to return. We have often seen them taken in the Thames at London, both above the bridges and below them. It is curious enough to observe with what activity they avoid their pursuers, and what little time they require to fetch breath above the water. The manner of killing them is for four or five boats to spread over the part of the river in which they are seen, and with fire-arms to shoot at them the instant they rise above the water. The fish being thus for some time kept in agitation, requires to come to the surface at quicker intervals, and thus affords the marksmen more frequent opportunities.

* During a scarcity of fish, porpoises are said to dive to the bottom, and root, like hogs, among the sand, for sand-eels and sea-worms. Hence in most languages they receive the name of sea-hogs. Porpoise has that signification in the Italian.

When the porpoise is taken, it becomes no inconsiderable capture, as it yields a very large quantity of oil ; and the lean of some, particularly if the animal be young, is said to be as well tasted as veal. The inhabitants of Norway prepare, from the eggs found in the body of this fish, a kind of cavier, which is said to be a very delicate sauce, or good when even eaten with bread. There is a fishery for porpoise along the western isles of Scotland during the summer season, when they abound on that shore ; and this branch of industry turns to good advantage.

As for the rest, we are told, that these animals go with young ten months ; that, like the whale, they seldom bring forth above one at a time, and that in the midst of summer : that they live to a considerable age ; though some say not above twenty-five or thirty years ; and they sleep with the snout above water. They seem to possess, in a degree proportioned to their bulk, the manners of whales ; and the history of one species of cetaceous animals, will, in a great measure, serve for all the rest.

BOOK II.

OF CARTILAGINOUS FISHES.

CHAP. I.

OF CARTILAGINOUS FISHES IN GENERAL.

WE have seen that fishes of the cetaceous kind bear a strong resemblance to quadrupeds in their conformation; those of the cartilaginous kinds are one remove separated from them; they form the shade that completes the imperceptible gradations of nature.

The first great distinction they exhibit is, in having cartilages or gristles instead of bones. The cetaceous tribes have their bones entirely resembling those of quadrupeds, thick, white, and filled with marrow; those of the spinous kind, on the contrary, have small slender bones, with points resembling thorns, and generally solid throughout. Fishes of the cartilaginous kinds have their bones always soft and yielding; and age, that hardens the bones of other animals, rather contributes still more to soften theirs. The size of all fishes increases with age; but from the pliancy of the bones in this tribe, they seem to have no bounds placed to their dimensions; and it is supposed that they grow larger every day till they die.

They have other differences, more obviously discernible. We have observed, that the cetaceous tribes had lungs like quadrupeds, a heart with its partition in the same manner, and an apparatus for hearing; on the other hand, we mentioned that the spinous kinds had no organs of hearing, no lungs to breathe through, and no partition in the heart; but that their cold red blood was circulated by the means of the impulse made upon their gills by the water. Cartilaginous fishes unite both these

systems in their conformation: like the cetaceous tribes, they have organs of hearing, and lungs; like the spinous kinds, they have gills, and a heart without a partition. Thus possessed of a twofold power of breathing, sometimes by means of their lungs, sometimes by that of their gills they seem to unite all the advantages of which their situation is capable, and drawing from both elements every aid to their necessities or their enjoyments.

This double capacity of breathing in these animals, is one of the most remarkable features in the history of Nature. The apertures by which they breathe, are somewhere placed about the head; either beneath, as in flat fish; on the sides, as in sharks; or the top of the head, as in pipe-fish. To these apertures are the gills affixed, but without any bone to open and shut them, as in spinous fishes; from which, by this mark, they may be easily distinguished, though otherwise very much alike in appearance. From these are bending cylindrical ducts, that run to the lungs, and are supposed to convey the air, that gives the organs their proper play. The heart, however, has but one valve; so that their blood wants that double circulation which obtains in the cetaceous kinds; and the lungs seem to be rather as an internal assistant to the gills, than fitted for supplying the same offices as in quadrupeds, for they want the pulmonary vein and artery.

From this structure, however, the animal is enabled to live a longer time out of water than those whose gills are more simple. The cartilaginous shark, or ray, live some hours after they are taken; while the spinous herring or mackarel expire a few minutes after they are brought on shore. From hence this tribe seems possessed of powers that other fishes are wholly deprived of; they can remain continually under water, without ever taking breath; while they can venture their heads above the deep, and continue for hours out of their native element.

We observed, in a former chapter, that spinous fishes have not, or at least appear not to have, externally any instruments of generation. It is very different with those of the cartilaginous kind, for the male always has these instruments double. The fish of this tribe are not unfrequently seen to copulate; and their manner is belly to belly, such as may naturally be expected from animals whose parts of generation are placed forward. They in general choose colder seasons and situations than other

fish for propagating their kind ; and many of them bring forth in the midst of winter.

The same duplicity of character which marks their general conformation, obtains also with regard to their manner of bringing forth. Some bring forth their young alive ; and some bring forth eggs, which are afterwards brought to maturity. In all, however, the manner of gestation is nearly the same ; for upon dissection, it is ever found, that the young, while in the body, continue in the egg till a very little time before they are excluded : these eggs they may properly be said to hatch within their body ; and as soon as their young quit the shell, they begin to quit the womb also. Unlike to quadrupeds, or the cetaceous tribes, that quit the egg state in a few days after their first conception, and continue in the womb several months after, these continue in the body of the female, in their egg state, for weeks together ; and the eggs are found linked together by a membrane, from which, when the fœtus gets free, it continues but a very short time till it delivers itself from its confinement in the womb. The eggs themselves consist of a white and a yolk, and have a substance instead of shell, that aptly may be compared to softened horn. These, as I observed, are sometimes hatched in the womb, as in the shark and ray kinds ; and they are sometimes excluded, as in the sturgeon, before the animal comes to its time of disengaging. Thus we see that there seems very little difference between the viviparous and the oviparous kinds, in this class of fishes : the one hatch their eggs in the womb, and the young continue no long time there ; the others exclude their eggs before hatching, and leave it to time and accident to bring their young to maturity.

Such are the peculiar marks of the cartilaginous class of fishes, of which there are many kinds. To give a distinct description of every fish is as little my intention, as perhaps it is the wish of the reader ; but the peculiarities of each kind deserve notice, and the most striking of these it would be unpardonable to omit.

Cartilaginous fish may be divided first into those of the shark kind, with a body growing less towards the tail, a rough skin, with the mouth placed far beneath the end of the nose, five apertures on the sides of the neck for breathing, and the upper part of the tail longer then the lower. This class chiefly comprehends the Great White Shark, the Balance Fish, the Hound

Fish, the Monk Fish, the Dog Fish, the Basking Shark, the *Zygæna*, the Tope, the Cat Fish, the Blue Shark, the Sea Fox, the Smooth Hound Fish, and the Porbeagle. These are all of the same nature, and differ more in size, than in figure or conformation.

The next division is that of flat fish ; and these their broad, flat, thin shape, is sufficiently capable of distinguishing from all others of this kind. They may be easily distinguished also from spinous flat fish, by the holes through which they breathe, which are uncovered by a bone ; and which, in this kind, are five on each side. In this tribe we may place the Torpedo, the Skate, the Sharp-nosed Ray, the Rough Ray, the Thornback, and the Fire Flare.

The third division is that of the slender snake-shaped kind ; such as the Lamprey, the Pride, and the Pipe-fish.

The fourth division is that of the Sturgeon and its variety, the Ising-glass Fish.

The last division may comprise fish of different figures and natures, that do not rank under the former divisions. These are the Sun Fish, the Tetrodon, the Lump Fish, the Sea Snail, the Chimæra, and the Fishing Frog. Each of these has somewhat peculiar in its powers or its forms, that deserves to be remarked. The description of the figures of these at least may compensate for our general ignorance of the rest of their history.

CHAP. II.

OF CARTILAGINOUS FISHES OF THE SHARK KIND.*

Of all the inhabitants of the deep, those of the shark kind are the fiercest and the most voracious. The smallest of this

* About thirty species of sharks have been distinguished, of which twelve have been seen on the British coasts. Some, from pursuing their prey in concert, are called sea-dogs, hounds, and beagles. We may here particularize the Blue Shark, the Basking Shark, and the Angel Shark.

The *Blue Shark*.—The back of this shark is blue ; the belly white. No orifices are to be seen behind the eye, as is usual with fish of this genus. Two white membranes, one to each eye, perform the office of eye-lids. When the head was placed downwards, a pretty large white pouch came

tribe is not less dreaded by greater fish, than many that to appearance seem more powerful; nor do any of them seem fearful of attacking animals far above their size: but the Great White Shark, which is the largest of the kind, joins to the most amaz-

out of its mouth. Ælian supposed this to serve as an asylum for the young in time of danger; and Mr Pennant, who gives credit to the story, thinks that this fish, like the opossum, may have a place fitted by nature for the reception of her young. This, however, has been denied by some writers.

The *Basking Shark*.—This, though a very large fish, possesses none of the voracity and ferociousness that mark the generality of the shark tribe. It will frequently lie motionless on the surface of the water, generally on its belly, but sometimes on its back; and it seems so little afraid of mankind as often to suffer itself to be patted and stroked. Its body is slender, and from three to twelve yards in length; of a deep lead colour above, and white below. The upper jaw is blunt at the end, and much longer than the lower. The mouth is placed beneath, and furnished with small teeth; these before much bent, and the remote ones conical and sharp-pointed. On each side of the neck are five breathing apertures. There are two dorsal, two pectoral, two ventral fins, and one small anal fin. Within the mouth, near the throat, is a short kind of whale-bone. The liver is of such an immense size as frequently to weigh near a thousand pounds. From this a great quantity of good oil is extracted, which renders this shark an animal of considerable importance to the Scotch fishermen; for according to Anderson, the oil of a single fish will sometimes sell for twenty or thirty pounds sterling.

The basking shark (which derives its name from its propensity to lie on the surface of the water, as if to bask itself in the sun) frequents our seas during the warm summer months, and is not uncommon on the Welch and Scottish coasts, where they come in shoals, usually after intervals of a certain number of years. In the intervening summers, those that are seen upon the Welch coast are generally single fish, that have probably strayed from the rest. They appear in the frith of Clyde, and among the Hebrides, about midsummer, in small droves of seven or eight, or more commonly in pairs. Here they continue till the latter end of July, when they disappear.

The food of these sharks seems to consist entirely of marine plants, and some of the species of medusæ. They swim very deliberately, and generally with their upper fins above water. Sometimes they may be seen sporting about amongst the waves, and leaping several feet above the surface.

The natives of our northern coasts are very alert in the pursuit, and very dexterous in the killing of those fish. When pursued, they do not accelerate their motion till the boat comes almost in contact with them, when the harpooner strikes his weapon into the body as near the gills as he can. They seem not very susceptible of pain; for they often remain in the same place till the united strength of two men is exerted to force the harpoon deeper. As soon as they perceive themselves wounded, they plunge headlong to the bottom, and frequently coil the rope round their bodies in agony attempting to disengage themselves from the fatal instrument by rolling on the ground. Discovering that these efforts are in vain, they swim off with such amazing rapidity, that one instance has occurred of a basking shark pulling to some distance a vessel of seventy tons burden against a fresh gale.

ing rapidity, the strongest appetites for mischief: as he approaches nearly in size to the whale, he far surpasses him in strength and celerity, in the formidable arrangement of his teeth, and his insatiable desire of plunder.

The White Shark is sometimes seen to rank even among whales for magnitude; and is found from twenty to thirty feet long. Some assert that they have seen them of four thousand pound weight; and we are told particularly of one, that had a human corpse in his belly. The head is large and somewhat flattened; the snout long, and the eyes large. The mouth is enormously wide, as is the throat, and capable of swallowing a man with great ease. But its furniture of teeth is still more terrible; of these there are six rows, extremely hard, sharp-pointed, and of a wedge-like figure. It is asserted that there are

They sometimes run off with two hundred fathoms of line, and two harpoons in them; and will employ the men from twelve to twenty-four hours before they are subdued. As soon as they are killed, the fishermen haul them on shore; or, if at a distance from land, to the vessel's side, to cut them up and take out the liver, which is the only useful part of their bodies. This is melted into oil in kettles provided for the purpose; and if the fish be a large one, it yields eight barrels or upwards.

The Angel-shark.—This is very unlike the common sharks, being distinguished by its flat body, which forms the connecting link, as it were, between the genus of rays and that of sharks, as it partakes of the figure of both. The head is of a circular form, and rather broader than the body. The mouth is wide, and is situated at the extremity of the head. Like the sharks, the old fish of this species have more teeth than the young ones. Thus two angel-sharks, only a foot long, in the possession of Dr Block, had only two rows of teeth in the upper jaw, and three in the lower; while Willoughby and Rondelet assert, that there are three in the former, and five in the latter. The fins are large and wide, and their resemblance to wings has probably procured this fish the denomination of angel. Of a certain portion of the skin the Turks make the most beautiful shagreen for watch cases. The angel-shark is found in the Mediterranean and German Ocean.

The Spotted Dog-fish is an inhabitant of most seas, and measures four feet long; it is very voracious, and feeds chiefly upon fish. The body is reddish brown, with large distinct black spots; it is white beneath, and a little compressed at each end: the skin, when dried, is used for various purposes. The head is small, and the snout short; the eyes are oblong, and the pupil is of a sea-green colour; the iris of the eye is white; the mouth is oblong, and wide, armed with three rows of teeth; the tongue is cartilaginous, and with the palate is rough; the nostrils are surrounded with a lobe and vermiform appendage; the vent is placed before the middle of the body, the ventral fins distinct; the first dorsal fin is placed behind the ventral; the second dorsal fin is less, and nearly opposite the anal; the tail is narrow, ending below in a sharp angle.

seventy-two in each jaw, which make a hundred and forty-four in the whole ; yet others think that their number is uncertain ; and that in proportion as the animal grows older, these terrible instruments of destruction are found to increase. With these the jaws, both above and below, appear planted all over ; but the animal has a power of erecting or depressing them at pleasure. When the shark is at rest, they lie quite flat in his mouth ; but when he prepares to seize his prey, he erects all this dreadful apparatus, by the help of a set of muscles that join them to the jaw ; and the animal he seizes, dies, pierced with a hundred wounds, in a moment.

Nor is this fish less terrible to behold as to the rest of his form : his fins are larger in proportion ; he is furnished with great goggle eyes, that he turns with ease on every side, so as to see his prey behind him as well as before ; and his whole aspect is marked with a character of malignity : his skin also is rough, hard, and prickly ; being that substance which covers instrument cases, called shagreen.

As the shark is thus formidable in his appearance, so is he also dreadful from his courage and activity. No fish can swim so fast as he ; none so constantly employed in swimming : he outstrips the swiftest ships, plays round them, darts out before them, returns, seems to gaze at the passengers, and all the while does not seem to exhibit the smallest symptom of an effort to proceed. Such amazing powers, with such great appetites for destruction, would quickly unpeople even the ocean, but providentially, the shark's upper jaw projects so far above the lower, that he is obliged to turn on one side, (not on his back, as is generally supposed,) to seize his prey. As this takes some small time to perform, the animal pursued seizes that opportunity to make its escape.

Still, however, the depredations he commits are frequent and formidable. The shark is the dread of sailors in all hot climates ; where, like a greedy robber, he attends the ships, in expectation of what may drop over-board. A man who unfortunately falls into the sea at such a time, is sure to perish, without mercy. A sailor that was bathing in the Mediterranean, near Antibes, in the year 1744, while he was swimming about fifty yards from the ship, perceived a monstrous fish making towards him, and surveying him on every side, as fish are often seen to look round

a bait. The poor man, struck with terror at its approach, cried out to his companions in the vessel to take him on board. They accordingly threw him a rope with the utmost expedition, and were drawing him up by the ship's side, when the shark darted after him from the deep, and snapped off his leg.

Mr Pennant tells us, that the master of a Guinea-ship, finding a rage for suicide prevail among his slaves, from a notion the unhappy creatures had, that after death they should be restored again to their families, friends, and country; to convince them at least that some disgrace should attend them here, he ordered one of their dead bodies to be tied by the heels to a rope, and so let down into the sea; and, though it was drawn up again with great swiftness, yet in that short space, the sharks had bit off all but the feet. Whether this story is prior to an accident of the same kind, which happened at Belfast in Ireland, about twenty years ago, I will not take upon me to determine; but certain it is, there are some circumstances alike in both, though more terrible in that I am going to relate. A Guinea captain was, by stress of weather, driven into the harbour of Belfast, with a lading of very sickly slaves, who, in the manner above-mentioned, took every opportunity to throw themselves overboard when brought up upon the deck, as usual, for the benefit of the fresh air. The captain perceiving, among others, a woman slave attempting to drown herself, pitched upon her as a proper example to the rest. As he supposed that they did not know the terrors attending death, he ordered the woman to be tied with a rope under the arm-pits, and so let her down into the water. When the poor creature was thus plunged in, and about half way down, she was heard to give a terrible shriek, which at first was ascribed to her fears of drowning; but soon after, the water appearing red all round her, she was drawn up, and it was found that a shark, which had followed the ship, had bit her off from the middle.*

* A singular circumstance occurred in February 1814, at St Vincent, in Jamaica. A gentleman, named Whitlow, sailing in a boat at night from the leeward port of Kingston, and sitting in the stern sheets, a large shark that had followed made at length a spring at his intended victim, knocked off his hat, but at the same time fell into the boat. The gentleman, with great presence of mind, immediately jumped up and secured the voracious monster with a cloak and some bandages. It measured twelve feet, and was of enormous weight.

A Calcutta paper contains the following extract of a letter from Kidge.

Such is the frightful rapacity of this animal ; nothing that has life is rejected. But it seems to have a peculiar enmity to man ; when once it has tasted human flesh, it never desists from haunting those places where it expects the return of its prey. It is even asserted, that along the coasts of Africa, where these animals are found in great abundance, numbers of the negroes, who are obliged to frequent the waters, are seized and devoured by them every year. The people of these coasts are firmly of opinion, that the shark loves the black man's flesh in preference to the white, and that when men of different colours are in the water together, it always makes choice of the former.

However this be, men of all colours are equally afraid of this animal, and have contrived different methods to destroy him. In general, they derive their success from the shark's own rapacity. The usual method of our sailors to take him, is by baiting a great hook with a piece of beef or pork, which is thrown out into the sea by a strong cord, strengthened near the hook with an iron chain. Without this precaution, the shark would quickly bite the cord in two, and thus set himself free. It is no unpleasant amusement to observe this voracious animal coming up to survey the bait, particularly when not pressed by hunger. He approaches it, examines it, swims round it, seems for a while to neglect it, perhaps apprehensive of the cord and chain ; he quits it for a little ; but his appetite pressing, he returns again ; appears preparing to devour it, but quits it once more. When the sailors have sufficiently diverted themselves with his different evolutions, they then make a pretence, by drawing the rope, as if intending to take the bait away : it is then that the

ree, dated June 8th, 1814. " A boat belonging to the *Ingles* came up here that morning for water, and anchored in about one and a half fathom : a poor fellow belonging to her, attempted to swim on shore ; but, horrid to relate, scarcely had he plunged into the water, when he was attacked by two large voracious sharks, who stripped the flesh from his legs and thighs. We hastened to his relief, and dragged the unhappy man to the shore, when he instantly expired. I never before beheld such a spectacle."

We happen to know an old sailor in the suburbs of Glasgow, who lost one of his legs by the bite of a shark. He had been bathing (in what sea we forget) when suddenly he felt a numbness in his limb, and would have sunk but for the assistance of his comrades. On being lifted aboard, his limb was found to be gone, and so sudden and dexterous had the amputation been, that it was unaccompanied by any immediate pain, beyond the numbness adverted to.

glutton's hunger excites him ; he darts at the bait, and swallows it, hook and all. Sometimes, however, he does not so entirely gorge the whole, but that he once more gets free ; yet even then, though wounded and bleeding with the hook, he will again pursue the bait until he is taken. When he finds the hook lodged in his maw, his utmost efforts are then excited, but in vain, to get free ; he tries with his teeth to cut the chain ; he pulls with all his force to break the line ; he almost seems to turn his stomach inside out, to disgorge the hook : in this manner he continues his formidable though fruitless efforts ; till, quite spent, he suffers his head to be drawn above water, and the sailors, confining his tail by a noose, in this manner draw him on ship-board, and despatch him. This is done by beating him on the head till he dies ; yet even that is not effected without difficulty and danger ; the enormous creature, terrible even in the agonies of death, still struggles with his destroyers ; nor is there an animal in the world that is harder to be killed. Even when cut in pieces, the muscles still preserve their motion, and vibrate for some minutes after being separated from the body. Another method of taking them, is by striking a barbed instrument, called a fizgig, into his body, as he brushes along by the side of the ship. As soon as he is taken up, to prevent his flouncing, they cut off the tail with an axe, with the utmost expedition.

This is the manner in which Europeans destroy the shark ; but some of the Negroes along the African coast, take a bolder and more dangerous method to combat their terrible enemy. Armed with nothing more than a knife, the Negro plunges into the water, where he sees the shark watching for his prey, and boldly swims forward to meet him : though the great animal does not come to provoke the combat, he does not avoid it, and suffers the man to approach him ; but just as he turns upon his side to seize the aggressor, the Negro watches the opportunity, plunges his knife into the fish's belly, and pursues his blows with such success, that he lays the ravenous tyrant dead at the bottom : he soon however returns, fixes the fish's head in a noose, and drags him to shore, where he makes a noble feast for the adjacent villages.

Nor is man alone the only enemy this fish has to fear : the Remora, or Sucking-fish, is probably a still greater, and follows

the shark every where. This fish has got a power of adhering to whatever it sticks against, in the same manner as a cupping-glass sticks to the human body. It is by such an apparatus that this animal sticks to the shark, and drains away its moisture. The seamen, however, are of opinion, that it is seen to attend on the shark for more friendly purposes, to point him to his prey, and to apprise him of his danger. For this reason it has been called the Shark's Pilot.*

The shark so much resembles the whale in size, that some have injudiciously ranked it in the class of cetaceous fishes; but its real rank is in the place here assigned it, among those of the cartilaginous kind. It breathes with gills and lungs, its bones are gristly, and it brings forth several living young: Belonius assures us, that he saw a female shark produce eleven live young ones at a time. But I will not take upon me to vouch for the veracity of Rondeletius, who, when talking of the blue shark, says, that the female will permit her small brood, when in danger, to swim down her mouth, and take shelter in her belly. Mr Pennant, indeed, seems to give credit to the story, and thinks that this fish, like the opossum, may have a place fitted by nature for the

* In the month of May, 1798, Citizen Geoffroy found himself between Cape Bon and the island of Malta, where, much fatigued with the long continuance of a calm, the attention of all the passengers was excited by a shark advancing towards the vessel. The two pilots which preceded him, were seen to direct their course towards the poop of the vessel, which they inspected twice, from one end to the other; but finding that there was nothing which they might turn to their advantage, they resumed their former route: the shark never lost sight of his friends, but followed, as if he had been dragged by them. As soon as he was descried, one of the sailors threw a large hook into the sea, baited with lard. The three travellers, though they had already proceeded to the distance of 20 or 25 millemetres, hearing the noise occasioned by the fall of the bait, stopped short, and the two pilots detached themselves to examine the vessel; the shark, during their absence, sported on the surface of the water, turned himself on his back and dived, but always re-appeared at the same place. The pilots had no sooner discovered the lard, than they returned to their master with great velocity, made every effort to get before him, and then suddenly returned in the direction towards the vessel. They were followed by the shark, who appeared not to discover the lard, till the moment it was pointed out to him by his guides; it was then only that he began to swim with greater velocity, or rather made a jump to seize it, when the hook penetrated his lip, and he was immediately hoisted on board. It would be interesting to inquire into the causes of such a singular association, and to find out whether, according to the opinion of Cit. Bose, it is the dung of the shark that allures the pilot-fish.

reception of her young. To his opinion much deference is due, and is sufficient, at least, to make us suspend our dissent; for nothing is so contemptible as that affectation of wisdom which some display, by universal incredulity.¹

Upon the whole, a shark, when living, is a very formidable animal; and, when dead, is of very little value. The flesh is hardly digestible by any but the Negroes, who are fond of it to distraction: the liver affords three or four quarts of oil; some imaginary virtues have been ascribed to the brain; and its skin is, by great labour, polished into that substance called shagreen. Mr Pennant is of opinion, that the female is larger than the male in all this tribe; which would, if confirmed by experience, make a striking agreement between them and birds of prey. It were to be wished that succeeding historians would examine into this observation, which is offered only as a conjecture!

CHAP. III.

OF CARTILAGINOUS FLAT-FISH, OR THE RAY KIND.

THE same rapacity which impels the shark along the surface of the water, actuates the flat fish at the bottom. Less active, and less formidable, they creep in security along the bottom, seize every thing that comes in their way; neither the hardest shells nor the sharpest spines give protection to the animals that bear them; their insatiable hunger is such, that they devour all; and the force of their stomach is so great, that it easily digests them.

The whole of this kind resemble each other very strongly in their figure; nor is it easy, without experience, to distinguish one from another. The stranger to this dangerous tribe may

1 Sharks, as well as the Ray tribe, bring forth their young alive, more than one at a time, and each inclosed in a square horny case, terminated at the four corners by slender filaments. After being in the water some time, these natural pouches open at one end, and the young fish escapes from his confinement. These receptacles are, in the shark, of a pellucid horn-colour, terminated at the corners by very long slender filaments, which are generally found twisted round coral, sea-weeds, and other substances, to prevent their being driven on shore before the young is excluded: those of the Ray tribe are black, with the filaments hardly longer than the case, and are frequently cast on our shores in great abundance.

imagine he is only handling a skate, when he is instantly struck numb by the torpedo; he may suppose he has caught a thorn-back, till he is stung by the fire-flare. It will be proper, therefore, after describing the general figure of these animals to mark their differences.

All fish of the ray kind are broad, cartilaginous, swimming flat on the water, and having spines on different parts of their body, or at the tail. They all have their eyes and mouth placed quite under the body, with apertures for breathing either about or near them. They all have teeth, or a rough bone, which answers the same purpose. Their bowels are very wide towards the mouth, and go on diminishing to the tail. The tail is very differently shaped from that of other fishes; and at first sight more resembling that of a quadruped, being narrow, and ending either in a bunch or a point. But what they are chiefly distinguished by, is, their spines or prickles, which the different species have on different parts of their body. Some are armed with spines both above and below; others have them on the upper part only; some have their spines at the tail; some have three rows of them, and others but one. These prickles in some are comparatively soft and feeble; those of others, strong and piercing. The smallest of these spines are usually inclining towards the tail; the larger towards the head.

It is by the spines that these animals are distinguished from each other. The skate has the middle of the back rough, and a single row of spines on the tail.* The sharp-nosed ray has ten spines that are situated towards the middle of the back. The

* The skate is a well known fish, long and flat, if not caught before his full growth, when he is from five to six feet in length. His skin is black, and so very hard and rough, that it is often employed in polishing wood and ivory like the skin of a sea dog. This fish is extremely voracious, and armed with terrible teeth; nevertheless he has recourse to stratagem, catching his living food by concealing himself under the sands. The French make of its ashes an excellent soap for a certain cutaneous disorder, which is generally cured by sulphur, and by them called *savon d'ange*. Pliny attributed to the flesh of this fish a singular virtue when applied fresh to the necks of women,—that of preventing them from growing too large: it is certain it was very much used by the Romans; and Rondelet, one of the first naturalists of the sixteenth century, assures us that he tried the experiment with success. Skate are found in abundance on the coasts of Britain, and are in season from November to May, although the young ones are good throughout the year.

rough ray has its spines spread indiscriminately over the whole back. The thorn-back has its spines disposed in three rows upon the back. The fire-flare has but one spine, but that indeed a terrible one.—This dangerous weapon is placed on the tail, about four inches from the body, and is not less than five inches long. It is of a flinty hardness, the sides thin, sharp-pointed, and closely and sharply bearded the whole way. The last of this tribe that I shall mention is the torpedo; and this animal has no spines that can wound; but in the place of them it is possessed of one of the most potent and extraordinary faculties in nature.

Such are the principal differences that may enable us to distinguish animals, some of which are of very great use to mankind, from others that are terrible and noxious. With respect to their uses, indeed, as we shall soon see, they differ much; but the similitude among them, as to their nature, appetites, and conformation, is perfect and entire. They are all as voracious as they are plenty; and as dangerous to a stranger, as useful to him who can distinguish their differences.

Of all the larger fish of the sea, these are the most numerous; and they owe their numbers to their size. Except the white shark and cachalot alone, there is no other fish that has a swallow large enough to take them in; and their spines make them a still more dangerous morsel. Yet the size of some is such, that even the shark himself is unable to devour them; we have seen some of them in England weigh above two hundred pounds; but that is nothing to their enormous bulk in other parts of the world. Labat tells us of a prodigious ray that was speared by the Negroes at Guadaloupe, which was thirteen feet eight inches broad, and above ten feet from the snout to the insertion of the tail. The tail itself was in proportion, for it was no less than fifteen feet long, twenty inches broad at its insertion, and tapering to a point. The body was two feet in depth; the skin as ick as leather, and marked with spots; which spots, in all of this kind, are only glands, that supply a mucus to lubricate and soften the skin. This enormous fish was utterly unfit to be eaten by Europeans; but the Negroes chose out some of the nicest bits, and carefully salted them up as a most favourite provision.

Yet, large as this may seem, it is very probable that we have

seen only the smallest of the kind ; as they generally keep at the bottom, the largest of the kind are seldom seen ; and as they may probably have been growing for ages, the extent of their magnitude is unknown. It is generally supposed, however, that they are the largest inhabitants of the deep ; and, were we to credit the Norway bishop, there are some above a mile over. But to suppose an animal of such a magnitude is absurd ; yet the overstretching the supposition does not destroy the probability that animals of this tribe grow to an enormous size.

The ray generally chooses for its retreat such parts of the sea as have a black muddy bottom ; the large ones keep at greater depths ; but the smaller approach the shores, and feed upon whatever living animals they can surprise, or whatever putrid substances they meet with. As they are ravenous, they easily take the bait, yet will not touch it if it be taken up and kept a day or two out of water. Almost all fish appear much more delicate with regard to a baited hook than their ordinary food. They appear by their manner to perceive the line, and to dread it ; but the impulse of their hunger is too great for their caution ; and, even though they perceive the danger, if thoroughly hungry they devour the destruction.

These fish generate in March and April ; at which time only they are seen swimming near the surface of the water, several of the males pursuing one female. They adhere so fast together in coition, that the fishermen frequently draw up both together, though only one has been hooked. The females are prolific to an extreme degree ; there having been no less than three hundred eggs taken out of the body of a single ray. These eggs are covered with a tough horny substance, which they acquire in the womb ; for before they descend into that, they are attached to the ovary pretty much in the same manner as in the body of a pullet. From this ovary, or egg-bag, as it is vulgarly called, the fish's eggs drop one by one into the womb, and there receive a shell by the concretion of the fluids of that organ. When come to proper maturity, they are excluded, but never above one or two at a time, and often at intervals of three or four hours. These eggs, or purses, as the fishermen call them, are usually cast about the beginning of May, and they continue casting during the whole summer. In October, when their breeding ceases, they are exceedingly poor and thin ; but in November they be-

gin to improve, and grow gradually better till May, when they are in the highest perfection.

It is chiefly during the winter season that our fishermen take them; but the Dutch, who are indefatigable, begin their operations earlier, and fish with better success than we. The method practised by the fishermen of Scarborough is thought to be the best among the English; and, as Mr Pennant has given a very succinct account of it, I will take leave to present it to the reader.

“ When they go out to fish, each person is provided with three lines: each man’s lines are fairly coiled upon a flat oblong piece of wicker-work; the hooks being baited and placed very regularly in the centre of the coil. Each line is furnished with two hundred and eighty hooks, at the distance of six feet two inches from each other. The hooks are fastened to lines of twisted horse hair, twenty-seven inches in length.

“ When fishing, there are always three men in each coble; and consequently nine of these lines are fastened together, and used as one line, extending in length near three miles, and furnished with above two thousand five hundred hooks. An anchor and a buoy are fixed at the first end of the line, and one more at each end of each man’s lines; in all, four anchors, and four buoys made of leather or cork. The line is always laid across the current. The tides of flood and ebb continue an equal time upon our coast; and, when undisturbed by winds, run each way about six hours. They are so rapid that the fishermen can only shoot and haul their lines at the turn of the tide; and therefore the lines always remain upon the ground about six hours. The same rapidity of tide prevents their using hand lines; and, therefore, two of the people commonly wrap themselves in the sail and sleep, while the other keeps a strict look-out, for fear of being run down by ships, and to observe the weather; for storms often rise so suddenly, that it is sometimes with extreme difficulty they escape to the shore, though they leave their lines behind them.

“ The coble is twenty feet six inches long, and five feet extreme breadth. It is about one ton burden, rowed with three pair of oars, and admirably constructed for the purpose of encountering a mountainous sea. They hoist sail when the wind suits.

"The five-men-boat is forty feet long, fifteen broad, and twenty-five tons burden. It is so called, though navigated by six men and a boy; because one of the men is hired to cook, and does not share in the profits with the other five.—All our able fishermen go in these boats to the herring fishery at Yarmouth, the latter end of September, and return about the middle of November. The boats are then laid up until the beginning of Lent, at which time they go off in them to the edge of the Dogger, and other places, to fish for turbot, cod, ling, skate, &c. They always take two cobbles on board, and when they come upon their ground, anchor the boat, throw out the cobbles, and fish in the same manner as those do who go from the shore in a coble; with this difference only, that here each man is provided with double the quantity of lines, and, instead of waiting the return of the tide in the coble, return to the boat, and bait their other lines; thus hauling one set, and shooting another, every turn of tide. They commonly run into the harbour twice a-week, to deliver their fish. The five-men-boat is decked at each end, but open in the middle, and has two long sails.

"The best bait for all kinds of fish, is fresh herring cut in pieces of a proper size; and, notwithstanding what has been said to the contrary, they are taken there at any time in the winter, and all the spring, whenever the fishermen put down some nets for that purpose: the five-men-boats always take some nets for that end. Next to herrings are the lesser lampreys, which come all winter by land-carriage from Tadeaster. The next baits in esteem are small haddocks cut in pieces, sand-worms, muscles, and limpets; and, lastly, when none of these can be found, they use bullock's liver. The hooks used there are much smaller than those employed at Iceland and Newfoundland. Experience has shown that the larger fish will take a living small one upon the hook, sooner than any bait that can be put on; therefore they use such as the fish can swallow. The hooks are two inches and a half long in the shank; and near an inch wide between the shank and the point. The line is made of small cording, and is always tanned before it is used. All the rays and turbots are extremely delicate in their choice of baits: if a piece of herring or haddock has been twelve hours out of the sea, and then used as a bait, they will not touch it."

Such is the manner of fishing for those fish that usually keep

near the bottom on the coasts of England; and Duhamel observes, that the best weather for succeeding, is a half-calm, when the waves are just curled with a silent breeze.

But this extent of line, which runs, as we have seen, three miles along the bottom, is nothing to what the Italians throw out in the Mediterranean. Their fishing is carried on in a tartan, which is a vessel much larger than ours; and they bait a line of no less than twenty miles long, with above ten or twelve thousand hooks. This line is called the *parasina*: and the fishing goes by that of the *pielago*. This line is not regularly drawn every six hours, as with us, but remains for some time in the sea, and it requires the space of twenty-four hours to take it up. By this apparatus they take rays, sharks, and other fish; some of which are above a thousand pounds weight. When they have caught any of this magnitude, they strike them through with a harpoon to bring them on board, and kill them as fast as they can.

This method of catching fish is obviously fatiguing, and dangerous; but the value of the capture generally repays the pains. The skate and the thornback are very good food, and their size, which is from ten pounds to two hundred weight, very well rewards the trouble of fishing for them. But it sometimes happens that the lines are visited by very unwelcome intruders; by the rough ray, the fire-flare, or the torpedo. To all these the fishermen have the most mortal antipathy; and, when discovered, shudder at the sight: however, they are not always so much upon their guard, but that they sometimes feel the different resentments of this angry tribe; and, instead of a prize, find they have caught a vindictive enemy. When such is the case, they take care to throw them back into the sea with the swiftest expedition.

The rough ray inflicts but slight wounds with the prickles with which its whole body is furnished. To the ignorant it seems harmless, and a man would at first sight venture to take it in his hand, without any apprehension; but he soon finds, that there is not a single part of its body that is not armed with spines; and that there is no way of seizing the animal but by the little fin at the end of the tail.

But this animal is harmless, when compared to the fire-flare, which seems to be the dread of even the boldest and most ex-

perienced fishermen. The weapon with which nature has armed this animal, which grows from the tail, and which we described as barbed, and five inches long, hath been an instrument of terror to the ancient fishermen as well as the modern: and they have delivered many tremendous fables of its astonishing effects. Pliny, Ælian, and Oppian, have supplied it with a venom that affects even the inanimate creation: trees that are struck by it instantly lose their verdure, and rocks themselves are incapable of resisting the potent poison. The enchantress Circe armed her son with a spear headed with the spine of the trygon, as the most irresistible weapon she could furnish him with; a weapon that soon after was to be the death of his own father.

“That spears and darts,” says Mr Pennant, “might in very early times have been headed with this bone instead of iron, we have no doubt. The Americans head their arrows with the bones of fishes to this day; and, from their hardness and sharpness, they are no contemptible weapons. But that this spine is possessed of those venomous qualities ascribed to it, we have every reason to doubt; though some men of high reputation, and the whole body of fishermen, contend for its venomous effects. It is, in fact, a weapon of offence belonging to this animal, and capable, from its barbs, of inflicting a very terrible wound, attended with dangerous symptoms; but it cannot be possessed of any poison, as the spine has no sheath to preserve the supposed venom on its surface; and the animal has no gland that separates the noxious fluid: besides, all those animals that are furnished with envenomed fangs or stings, seem to have them strongly connected with their safety and existence; they never part with them; there is an apparatus of poison prepared in the body to accompany their exertions; and when the fangs or stings are taken away, the animal languishes and dies. But it is otherwise with the spine of the fire flare; it is fixed to the tail, as a quill is into the tail of a fowl, and is annually shed in the same manner: it may be necessary for the creature's defence, but it is no way necessary for its existence. The wound inflicted by an animal's tail, has something terrible in the idea, and may from thence alone be supposed to be fatal. From hence terror might have added poison to the pain, and called up imagined dangers: the Negroes universally believe that the sting is poisonous; but they never die of the wound; for by

opening the fish, and laying it on the part injured, it effects a speedy cure. The slightness of the remedy proves the innocence of the wound.¹

The Torpedo is an animal of this kind, equally formidable and well known with the former ; but the manner of its operating is to this hour a mystery to mankind. The body of this fish is almost circular, and thicker than others of the ray kind ; the skin is soft, smooth, and of a yellowish colour, marked, as all the kind, with large annular spots ; the eyes very small ; the tail tapering to a point ; and the weight of the fish from a quarter to fifteen pounds. Redi found one twenty-four pounds weight. To all outward appearance, it is furnished with no extraordinary powers ; it has no muscles formed for particularly great exertions ; no internal conformation perceptibly differing from the rest of its kind ; yet such is that unaccountable power it possesses, that, the instant it is touched, it numbs not only the hand and arm, but sometimes also the whole body. The shock received, by all accounts, most resembles the stroke of an electrical machine ; sudden, tingling, and painful. “ The instant,” says Kempfer, “ I touched it with my hand, I felt a terrible numbness in my arm, and as far up as the shoulder. Even if one treads upon it with the shoe on, it affects not only the leg, but the whole thigh upwards. Those who touch it with the foot, are seized with a stronger palpitation than even those who touch it with the hand.—This numbness bears no resemblance to that which we feel when a nerve is a long time pressed, and the foot is said to be asleep ; it rather appears like a sudden vapour, which passing through the pores in an instant, penetrates to the very springs of life, from whence it diffuses itself over the whole body, and gives real pain. The nerves are so affected, that the person struck imagines all the bones of his body, and particularly those of the limb that received the blow, are driven out of joint. All this is accompanied with a universal tremor, a sickness of the stomach, a general convulsion, and a total suspension of the faculties of the mind. In short,” continues Kempfer, “ such is the pain, that all the force of our promises and authority could not prevail upon a seaman to undergo the shock a second time.

¹ The account of the venomous properties of this spine, as well as that it is shed annually, appears to be altogether fabulous. It is probable that, by its great strength, it may be able to inflict a painfully lacerated wound.

A negro, indeed, that was standing by, readily undertook to touch the torpedo, and was seen to handle it without feeling any of its effects. He informed us, that his whole secret consisted in keeping in his breath; and we found, upon trial, that this method answered with ourselves. When we held in our breath, the torpedo was harmless; but when we breathed ever so little, its efficacy took place."

Kempfer has very well described the effects of this animal's shock; but succeeding experience has abundantly convinced us, that holding in the breath no way guards against its violence. Those, therefore, who depending on that receipt, should play with a torpedo, would soon find themselves painfully undeceived; not but that this fish may be many times touched with perfect security; for it is not upon every occasion that it exerts its potency. Reaumur, who made several trials upon this animal, has at least convinced the world that it is not necessarily, but by an effort, that the torpedo numbs the hand of him that touches it. He tried several times, and could easily tell when the fish intended the stroke, and when it was about to continue harmless. Always before the fish intended the stroke, it flattened the back, raised the head and the tail, and then, by a violent contraction in the opposite direction, struck with its back against the pressing finger; and the body, which before was flat, became humped and round.

But we must not infer, as he has done, that the whole effect of this animal's exertions arises from the greatness of the blow which the fingers receive at the instant they are struck. We will, with him, allow the stroke is very powerful, equal to that of a musquet-ball, since he will have it so; but it is very well known, that a blow, though never so great, on the points of the fingers, diffuses no numbness over the whole body: such a blow might break the ends of the fingers indeed, but would hardly numb the shoulder. Those blows that numb, must be applied immediately to some great and leading nerve, or to a large surface of the body; a powerful stroke applied to the points of the fingers will be excessively painful indeed, but the numbness will not reach beyond the fingers themselves. We must, therefore, look for another cause producing the powerful effects wrought by the torpedo.

Others have ascribed it to a tremulous motion which this

animal is found to possess, somewhat resembling that of a horse's skin, when stung by a fly. This operating under the touch with an amazing quickness of vibration, they suppose produces the uneasy sensation described above; something similar to what we feel when we rub plush cloth against the grain. But the cause is quite disproportioned to the effect; and so much beyond our experience, that this solution is as difficult as the wonder we want to explain.

The most probable solution seems to be, that the shock proceeds from an animal electricity, which this fish has some hidden power of storing up, and producing on its most urgent occasions. The shocks are entirely similar; the duration of the pain is the same; but how the animal contrives to renew the charge, how it is prevented from evaporating on contiguous objects, how it is originally procured, these are difficulties that time alone can elucidate.

But to know even the effects is wisdom. Certain it is, that the powers of this animal seem to decline with its vigour; for as its strength ceases, the force of the shock seems to diminish; till, at last, when the fish is dead, the whole power is destroyed, and it may be handled or eaten with perfect security: on the contrary, when immediately taken out of the sea, its force is very great, and not only affects the hand, but if even touched with a stick, the person finds himself sometimes affected. This power, however, is not to be extended to the degree that some would have us believe; as reaching the fisherman at the end of the line, or numbing fishes in the same pond. Godignus, in his *History of Abyssinia*, carries this quality to a most ridiculous excess; he tells us of one of these that was put into a basket among a number of dead fishes, and that the next morning the people, to their utter astonishment, perceived that the torpedo had actually numbed the dead fishes into life again.

To conclude, it is generally supposed that the female torpedo is much more powerful than the male. Lorenzini, who has made several experiments upon this animal, seems convinced that its power wholly resides in two thin muscles that cover a part of the back. These he calls the trembling fibres; and he asserts that the animal may be touched with safety in any other part. It is now known also that there are more fish, than this of the ray kind, possessed of the numbing quality, which has

acquired them the name of the torpedo. These are described by Atkins and Moore, and found in great abundance along the coast of Africa. They are shaped like a mackarel, except that the head is much larger; the effects of these seem also to differ in some respects. Moore talks of keeping his hand upon the animal; which in the ray torpedo it is actually impossible to do. "There was no man in the company," says he, "that could bear to keep his hand on this animal the twentieth part of a minute, it gave him so great pain; but upon taking the hand away, the numbness went off, and all was well again. This numbing quality continued in this torpedo even after it was dead; and the very skin was still possessed of its extraordinary power till it became dry." Condamine informs us of a fish possessed of the powers of the torpedo, of a shape very different from the former, and every way resembling a lamprey. This animal, if touched by the hand, or even with a stick, instantly benumbs the hand and arm to the very shoulder; and sometimes the man falls down under the blow. These animals, therefore, must affect the nervous system in a different manner from the former, both with respect to the manner and the intention; but how this effect is wrought, we must be content to dismiss in obscurity.¹

1 From a number of experiments made by Mr Walsh, and communicated to the Royal Society, it appears that the powers of this animal are purely electric; though no spark could ever be discovered to proceed from it, nor were pith-balls ever affected by it. "A live Torpedo," says he, "was placed on a table; round another table stood five persons insulated; two brass wires, each thirteen feet long, were suspended from the ceiling by silken strings; one of these wires rested by one end on the wet napkin on which the fish lay; the other end was immersed in a basin full of water, placed on a second table, on which stood four other basins likewise full of water; the first person put a finger of one hand in the basin in which the wire was immersed, and a finger of the other hand in a second basin, the second person put a finger of one hand in this last basin, and a finger of the other hand in the third; and so on successively, till the five persons communicated with one another by the water in the basins. In the last basin, one end of the second wire was immersed, and with the other end Mr Walsh touched the torpedo; when five persons felt a commotion, which differed in nothing from that of the Leyden experiment, except in the degree of force. Mr Walsh, who was not in the circle of conduction, received no shock. The action of the torpedo is communicated by the same mediums as that of the electric fluid; and the bodies which intercept the action of the one, intercept likewise the action of the other. The effect produced by the torpedo, when in air, appeared, on many repeated experiments, to be about four times as strong as when in water. The numbness produced by the

CHAP. IV.

OF THE LAMPREY, AND ITS AFFINITIES.

THERE is a species of the Lamprey served up as a great delicacy among the modern Romans, very different from ours. Whether theirs be the *maræna* of the ancients, I will not pretend to say; but there is nothing more certain than that our lamprey is not. The Roman lamprey agrees with the ancient fish in being kept in ponds, and considered by the luxurious as a very great delicacy.

The lamprey, known among us, is differently estimated, according to the season in which it is caught, or the place where it has been fed. Those that leave the sea to deposit their spawn in fresh waters are the best: those that are entirely bred in our rivers, and that have never been at sea, are considered as much inferior to the former. Those that are taken in the months of March, April, or May, just upon their leaving the sea, are reckoned very good; those that are caught after they have cast their spawn, are found to be flabby, and of little value. Those caught in several of the rivers in Ireland, the people will not venture to touch; those of the English Severn, are considered as the most delicate of all other fish whatever. *

shock of the torpedo was imitated by artificial electricity, and shown to be producible by a quick concussion of minute shocks. This, in the torpedo, may be effected by the successive discharges of his numerous cylinders, the organs of its power, in the nature of a running fire of musquetry; the strong single shock may be his general volley. In the continued effect, as well as the instantaneons, his eyes, which are usually prominent, are withdrawn into their sockets. A coated vial was applied to it, but could not be charged.—Two other fishes are known to possess this extraordinary power: the electrical Eel, which is able to give a shock even greater than the torpedo; and the electric *Silurus*, whose shock is much less vigorous than either of the others.

* There are about 9 species of lampreys known.—The *Lesser Lamprey*. This fish inhabits Europe, Japan, and the lakes of South America; it measures from twelve to fifteen inches long: it ascends fresh water rivers in the spring, and after a few months returns again to the sea. Its body is varied with transverse waved lines, above it is blackish, yellowish at the sides, and whitish beneath; its head is of a greenish colour; behind the row of lesser teeth there are larger ones, of which there are seven connected above, beneath there are two distant; the eyes are small; the iris is of a gold colour.

The lamprey much resembles an eel in its general appearance, but is of a lighter colour, and rather a clumsier make. It differs however in the mouth, which is round, and placed rather obliquely below the end of the nose. It more resembles the mouth of a leech than an eel; and the animal has a hole on the top of the head through which it spouts water, as in the cetaceous kind. There are seven holes on each side for respiration; and the fins are formed rather by a lengthening out of the skin, than any set of bones or spines for that purpose. As the mouth is formed resembling that of a leech, so it has a property resembling that animal, of sticking close to and sucking any body it is applied to. It is extraordinary the power they have of adhering to stones; which they do so firmly, as not to be drawn off without some difficulty. We are told of one that weighed but three pounds, and yet it stuck so firmly to a stone of twelve pounds, that it remained suspended at its mouth, from which it was separated with no small difficulty. This amazing power of suction is supposed to arise from the animal's exhausting the air within its body by the hole over the nose, while the mouth is closely fixed to the object, and permits no air to enter. It would be easy to determine the weight this animal is thus able to sustain; which will be equal to the weight of a column of air of equal diameter with the fish's mouth.

From some peculiarity of formation, this animal swims generally with its body as near as possible to the surface; and it might easily be drowned by being kept by force for any time under water. Muralto has given us the anatomy of this animal; but, in a very minute description, makes no mention of lungs. Yet I am very apt to suspect, that two red glands tissue with nerves, which he describes as lying towards the back of the head, are no other than the lungs of this animal. The absolute necessity it is under of breathing in the air, convinces me that it

towards the head there is the appearance of a lateral line, the fins are of a violet colour; and the second dorsal fin angulate.

The Lampern is also an inhabitant of the European rivers, particularly the Isis, near Oxford; is from six to seven inches long. It conceals itself under stones, or in the mud, and does not adhere to stones like the others; the body is round, and tapering at each end, and annulate; it is of a greenish colour above, yellowish at the sides, and white beneath; the mouth is lobate, and without teeth; the fins are hardly a line broad; the second dorsal fin is linear; the tail lanceolate, and sharp at the end.

must have lungs, though I do not know of any anatomist that has described them.

The adhesive quality in the lamprey may be, in some measure, increased by that slimy substance with which its body is all over smeared ; a substance that serves at once to keep it warm in its cold element, and also to keep its skin soft and pliant. This mucus is separated by two long lymphatic canals, that extend on each side from the head to the tail, and that furnish it in great abundance. As to its intestines, it seems to have but one great bowel, running from the mouth to the vent, narrow at both ends, and wide in the middle.

So simple a conformation seems to imply an equal simplicity of appetite. In fact, the lamprey's food is either slime and water, or such small water-insects as are scarcely perceivable. Perhaps its appetite may be more active at sea, of which it is properly a native ; but when it comes up into our rivers, it is hardly perceived to devour any thing.

Its usual time of leaving the sea, which it is annually seen to do in order to spawn, is about the beginning of spring ; and after a stay of a few months it returns again to the sea. Their preparation for spawning is peculiar ; their manner is to make holes in the gravelly bottom of rivers ; and on this occasion their sucking power is particularly serviceable ; for if they meet with a stone of a considerable size they will remove it, and throw it out. Their young are produced from eggs in the manner of flat fish ; the female remains near the place where they are excluded, and continues with them till they come forth. She is sometimes seen with her whole family playing about her ; and after some time she conducts them in triumph back to the ocean.

But some have not sufficient strength to return ; and these continue in the fresh water till they die. Indeed the life of this fish, according to Rondeletius, who has given its history, is but of very short continuance ; and a single brood is the extent of the female's fertility. As soon as she has returned after casting her eggs, she seems exhausted and flabby. She becomes old before her time ; and two years is generally the limit of her existence.

However this may be, they are very indifferent eating after they have cast their eggs, and particularly at the approach of hot weather. The best season for them is the months of March,

April, and May ; and they are usually taken in nets with salmon, and sometimes in baskets at the bottom of the river. It has been an old custom for the city of Gloucester annually to present the king with a lamprey-pie ; and as the gift is made at Christmas, it is not without great difficulty the corporation can procure the proper quantity, though they give a guinea a-piece for taking them.*

How much they were valued among the ancients, or a fish bearing some resemblance to them, appears from all the classics that have praised good living, or ridiculed gluttony. One story we are told of this fish, with which I will conclude its history. A senator of Rome, whose name does not deserve being transmitted to posterity, was famous for the delicacy of his lampreys. Tigelinus Manucius, and all the celebrated epicures of Rome, were loud in his praises : no man's fish had such a flavour, was so nicely fed, or so exactly pickled. Augustus, hearing so much of this man's entertainments, desired to be his guest ; and soon found that fame had been just to his merits ; the man had indeed very fine lampreys, and of an exquisite flavour. The emperor was desirous of knowing the method by which he fed his fish to so fine a relish ; and the glutton, making no secret of his art, informed him, that his way was to throw into his ponds such of his slaves as had at any time displeased him. Augustus, we are told, was not much pleased with his receipt, and instantly ordered all his ponds to be filled up. The story would have ended better if he had ordered the owner to be flung in also.

CHAP. V.

OF THE STURGEON, AND ITS VARIETIES.

THE Sturgeon, with a form as terrible, and a body as large, as the shark, is yet as harmless as the fish we have been just describing ; incapable and unwilling to injure others, it flies from the smallest fishes, and generally falls a victim to its own timidity.

* Henry I. of England died of a surfeit from eating lampreys.

The sturgeon, in its general form, resembles a fresh-water pike. The nose is long; the mouth is situated beneath, being small, and without jaw-bones or teeth. But though it is so harmless and ill provided for war, the body is formidable enough to appearance. It is long, pentagonal, and covered with five rows of large bony knobs, one row on the back and two on each side, and a number of fins to give it greater expedition. Of this fish there are three kinds; the Common Sturgeon, the Caviar Sturgeon, and the Huso or Isinglass Fish.* The first has eleven knobs or scales on the back; the second has fifteen; and the latter thirteen on the back, and forty-three on the tail. These differences seem light to us who only consider the animal's form; but those who consider its uses find the distinction of considerable importance. The first is the sturgeon, the flesh of which is sent pickled into all parts of Europe. The second, is the fish from the roe of which that noted delicacy called Caviar is made; and the third, besides supplying the caviar, furnishes also the valuable commodity of isinglass. They all grow to a very great size; and some of them have been found above eighteen feet long.

There is not a country in Europe but what this fish visits at different seasons; it annually ascends the largest rivers to spawn, and propagates in an amazing number. The inhabitants along the banks of the Po, the Danube, and the Wolga, make great profit yearly of its incursions up the stream, and have their nets prepared for its reception. The sturgeon also is brought daily to the markets of Rome and Venice, and they are known to abound in the Mediterranean sea. Yet those fish that keep entirely either in salt or fresh water are but comparatively small. When the sturgeon enjoys the vicissitude of fresh and salt water, it is then that it grows to an enormous size, so as almost to rival even the whale in magnitude.

Nor are we without frequent visits from this much esteemed fish in England. It is often accidentally taken in our rivers in salmon-nets, and particularly in those parts that are not far remote from the sea. The largest we have heard of, caught in Great Britain, was a fish taken in the Eske, where they are

* Five species of sturgeon are now known. The new are the *Ruthinus* and the *Stellatus*, both of which inhabit the Caspian Sea.

most frequently found, which weighed four hundred and sixty pounds. An enormous size to those who have only seen our fresh-water fishes !

North America also furnishes the sturgeon: their rivers in May, June, and July, supply them in very great abundance. At that time they are seen sporting in the water, and leaping from its surface several yards into the air. When they fall again on their sides, the concussion is so violent, that the noise is heard, in still weather, at some miles distance.

But of all places where this animal is to be found, it appears no where in such numbers as in the lakes of Frischehauff and Curischaff, near the city of Pillau. In the rivers also that empty themselves into the Euxine sea, this fish is caught in great numbers, particularly at the mouth of the river Don. In all these places the fishermen regularly expect their arrival from the sea, and have their nets and salt ready prepared for their reception.

As the sturgeon is a harmless fish, and no way voracious, it is never caught by a bait in the ordinary manner of fishing, but always in nets. From the description given above of its mouth, it is not to be supposed that the sturgeon would swallow any hook capable of holding so large a bulk and so strong a swimmer. In fact, it never attempts to seize any of the finny tribe, but lives by rooting at the bottom of the sea, where it makes insects and sea-plants its whole subsistence. From this quality of floundering at the bottom it has received its name; which comes from the German verb *floeren*, signifying to wallow in the mud. That it lives upon no large animals is obvious to all those who cut it open, where nothing is found in its stomach but a kind of slimy substance, which has induced some to think it lives only upon water and air. From hence there is a German proverb, which is applied to a man extremely temperate, when they say, he is as moderate as a sturgeon.

As the sturgeon is so temperate in its appetites, so is it also equally timid in its nature. There would be scarcely any method of taking it, did not its natural desire of propagation induce it to incur so great a variety of dangers. The smallest fish is alone sufficient to terrify a shoal of sturgeons; for, being unfurnished with any weapon of defence, they are obliged to trust to their swiftness and their caution for security. Like all animals that

do not make war upon others, sturgeons live in society among themselves : rather for the purposes of pleasure than from any power of mutual protection. Gesner even asserts, that they are delighted with sounds of various kinds ; and that he has seen them shoal together at the notes of a trumpet.

The usual time, as was said before, for the sturgeon to come up rivers to deposit its spawn, is about the beginning of summer, when the fishermen of all great rivers make a regular preparation for its reception. At Pillau, particularly, the shores are formed into districts, and allotted to companies of fishermen, some of which are rented for about three hundred pounds a-year. The nets in which the sturgeon is caught are made of small cord, and placed across the mouth of the river ; but in such a manner that, whether the tide ebbs or flows, the pouch of the net goes with the stream.—The sturgeon thus caught, while in the water, is one of the strongest fishes that swims, and often breaks the net to pieces that incloses it ; but the instant it is raised, with its head above water, all its activity ceases ; it is then a lifeless, spiritless lump, and suffers itself to be tamely dragged on shore. It has been found prudent, however, to draw it to shore gently ; for if excited by any unnecessary violence, it has been found to break the fisherman's legs with a blow of its tail. The most experienced fishers, therefore, when they have drawn it to the brink, keep the head still elevated, which prevents its doing any mischief with the hinder part of the body : others, by a noose, fasten the head and the tail together ; and thus without immediately despatching it, bring it to the market, if there be one near, or keep it till their number is completed for exportation.

The flesh of this animal, pickled, is very well known at all the tables of Europe ; and is even more prized in England than in any of the countries where it is usually caught. The fishermen have two different methods of preparing it. The one is by cutting it in long pieces lengthwise, and, having salted them, by hanging them up in the sun to dry : the fish thus prepared is sold in all the countries of the Levant, and supplies the want of better provision. The other method, which is usually practised in Holland, and along the shores of the Baltic, is to cut the sturgeon crosswise, into short pieces, and put it in small barrels, with a pickle made of salt and saumure. This is the sturgeon which is sold in England ; and of which great quantities

came from the North, until we gave encouragement to the importation of it from North America. From thence we are very well supplied ; but it is said, not with such good fish as those imported from the North of Europe.

A very great trade is also carried on with the roe of the sturgeon, preserved in a particular manner, and called Caviar : it is made from the roe of all kinds of sturgeon, but particularly the second. This is much more in request in other countries of Europe than with us. To all these high-relished meats, the appetite must be formed by degrees ; and though formerly, even in England, it was very much in request at the politest tables, it is at present sunk entirely into disuse. It is still, however, a considerable merchandise among the Turks, Greeks, and Venetians. Caviar somewhat resembles soft soap in consistence ; but it is of a brown, uniform colour, and is eaten as cheese with bread. The manner of making it is this : they take the spawn from the body of the sturgeon—for it is to be observed, the sturgeon differs from other cartilaginous fish, in that it has spawn like a cod, and not eggs like a ray. They take the spawn, I say, and freeing it from the small membranes that connect it together, they wash it with vinegar, and afterwards spread it to dry upon a table ; they then put them into a vessel with salt, breaking the spawn with their hands, and not with a pestle ; this done, they put it into a canvass bag, letting the liquor drain from it ; lastly, they put it into a tub, with holes in the bottom, so that, if there be any moisture still remaining, it may run out ; then it is pressed down, and covered up close for use.

But the Huso or Isinglass fish furnishes a still more valuable commodity. This fish is caught in great quantities in the Danube, from the month of October to January : it is seldom under fifty pounds weight, and often above four hundred : its flesh is soft, glutinous, and flabby ; but it is sometimes salted, which makes it better tasted, and then it turns red like salmon. It is for the commodity it furnishes that it is chiefly taken. Isinglass is of a whitish substance, inclining to a yellow, done up into rolls, and so exported for use. It is very well known as serviceable, not only in medicine, but many arts. The varnisher, the wine-merchant, and even the clothier, know its uses ; and very great sums are yearly expended upon this single article of commerce. The manner of making it is this : they take the

skin, the entrails, the fins, and the tail of this fish, and cut them into small pieces; these are left to macerate in a sufficient quantity of warm water, and they are all boiled shortly after with a slow fire, until they are dissolved and reduced to a jelly; this jelly is spread upon instruments made for the purpose, so, that drying, it assumes the form of parchment, and, when quite dry it is then rolled into the form which we see in the shops.*

This valuable commodity is principally furnished from Russia where they prepare great quantities surprisingly cheap. Mr Jackson, an ingenious countryman of our own, found out an obvious method of making a glue at home that answered all the purposes of isinglass; but what with the trouble of making it, and perhaps the arts put in practice to undersell him, he was, as I am told, obliged to discontinue the improvement of his discovery. Indeed, it is a vain attempt to manufacture among ourselves those things which may be more naturally and cheaply supplied elsewhere. We have many trades that are unnaturally, if I may so express it, employed among us; who furnish more laboriously those necessities with which other countries could easily and cheaply supply us. It would be wiser to take what they can thus produce; and to turn our artizans to the increase and manufacture of such productions as thrive more readily among us. Were, for instance, the number of hands that we have now employed in the manufacture of silk, turned to the increase of agriculture, it is probable that the increased quantity of corn thus produced, would be more than an equivalent for the diminution of national wealth in purchasing wrought silk from other countries.

CHAP. VI.

OF ANOMALOUS CARTILAGINOUS FISHES.

Of all others, the Cartilaginous class seems to abound with the greatest variety of ill-formed animals; and, if philosophy

* Isinglass is prepared from various other fishes, but principally from the White Dolphin, or Belluga of North America. This well-known substance is made from the sound, or air-bladder.

could allow the expression, we might say, that the cartilaginous class was the class of monsters ; in fact, it exhibits a variety of shapeless beings, the deviations of which from the usual form of fishes are beyond the power of words to describe, and scarcely of the pencil to draw. In this class we have the Pipe Fish, that almost tapers to a thread, and the Sun Fish, that has the appearance of a bulky head, but the body cut off in the middle ; the Hippocampus, with a head somewhat like that of a horse, and the Water Bat, whose head can scarcely be distinguished from the body. In this class we find the Fishing Frog, which from its deformity some have called the Sea Devil ; the Chimæra, the Lump Fish, the Sea Porcupine, and the Sea Snail. Of all these the history is but little known ; and naturalists supply the place with description.

The Sun Fish sometimes grows to a very large size ; one taken near Plymouth was five hundred weight. In form it resembles a bream, or some deep fish cut off in the middle : the mouth is very small, and contains in each jaw two broad teeth, with sharp edges : the colour of the back is dusky and dappled, and the belly is a silvery white. When boiled, it has been observed to turn to a glutinous jelly, and would most probably serve for all the purposes of isinglass, were it found in sufficient plenty.

The Fishing Frog in shape very much resembles a tadpole or young frog ; but then a tadpole of enormous size, for it grows to above five feet long, and its mouth is sometimes a yard wide. Nothing can exceed its deformity. The head is much bigger than the whole body ; the under jaw projects beyond the upper, and both are armed with rows of slender sharp teeth : the palate and the tongue are furnished with teeth in like manner : the eyes are placed on the top of the head, and are encompassed with prickles : immediately above the nose, are two long beards or filaments, small in the beginning, but thicker at the end, and round : these, as it is said, answer a very singular purpose ; for being made somewhat resembling a fishing-line, it is asserted, that the animal converts them to the purposes of fishing. With these extended, as Pliny asserts, the fishing frog hides in muddy waters, and leaves nothing but the beards to be seen : the curiosity of the smaller fish brings them to view these filaments, and their hunger induces them to seize the bait ; upon which the animal

in ambush instantly draws in its filaments, with the little fish that had taken the bait, and devours it without mercy. This story, though apparently improbable, has found credit among some of our best naturalists ; but what induces me to doubt the fact is, that there is another species of this animal, that has no beards, which it would not want if they were necessary to the existence of the kind. Rondeletius informs us, that if we take out the bowels, the body will appear with a kind of transparence ; and that if a lighted candle be placed within the body, as in a lantern, the whole has a very formidable appearance. The fishermen, however, have in general a great regard for this ugly fish, as it is an enemy to dog-fish, the bodies of those fierce and voracious animals being often found in its stomach : whenever they take it, therefore, they always set it at liberty.

The Lump Fish is trifling in size, compared to the former : its length is but sixteen inches, and its weight about four pounds ; the shape of the body is like that of a bream, deep, and it swims edgeways ; the back is sharp and elevated, and the belly flat ; the lips, mouth, and tongue of this animal, are of a deep red ; the whole skin is rough, with bony knobs ; the largest row is along the ridge of the back ; the belly is of a bright crimson colour : but what makes the chief singularity in this fish, is an oval aperture in the belly, surrounded with a fleshy soft substance that seems bearded all round ; by means of this part it adheres with vast force to any thing it pleases. If flung into a pail of water, it will stick so close to the bottom, that on taking the fish by the tail, one may lift up pail and all, though it holds several gallons of water. Great numbers of these fish are found along the coasts of Greenland in the beginning of summer, where they resort to spawn. Their roe is remarkably large, and the Greenlanders boil it to a pulp for eating. They are extremely fat, but not admired in England, being both flabby and insipid.

The Sea Snail takes its name from the soft and unctuous texture of its body, resembling the snail upon land. It is almost transparent, and soon dissolves and melts away. It is but a little animal, being not above five inches long. The colour, when fresh taken, is of a pale brown, the shape of the body round, and the back fin reaches all the way from the head to the tail. Beneath the throat is a round depression, of a whitish colour

surrounded by twelve brown spots, placed in a circle. It is taken in England at the mouth of rivers, four or five miles distant from the sea.

The body of the Pipe Fish, in the thickest part, is not thicker than a swan-quill, while it is above sixteen inches long. This is angular, but the angles being not very sharp, they are not discernible until the fish is dried. Its general colour is an olive-brown, marked with numbers of bluish lines, pointing from the back to the belly. It is viviparous; for on crushing one that was just taken, hundreds of very minute young ones were observed to crawl about.*

* The following is a description of a tobacco pipe fish taken at Salcomb in 1807.—Length twenty inches and a half, viz. ten to the vent, and ten and a half to the end of the tail: the snout similar to that of *acus*; its length to the eye three quarters of an inch; from thence to the end of the gill, including the eye, one inch: the form of the body rather compressed, and angular, with an acute dorsal and abdominal ridge, which, together with three slight angles on each side, gave it an octangular appearance; it was of equal size from the gills to the vent, which part contains about thirty plates; from the vent to the extremity of the tail it was almost round, and extremely taper, containing about sixty-six plates; immediately behind the vent, the body suddenly decreased to one-third less in diameter; but this may have been a sexual distinction.

The *Gar Fish*.—The Gar Fish belongs to the class of needle fish, which denomination they have received from the extreme length of their bodies in proportion to their thickness. They have no scales, but scuta or bucklers, with several angles. The hexagonal form of the body and the anal fin, are the distinguishing characters of the gar fish. The body is composed of eighteen scuta, and the tail of thirty-six, which form as many joints; the tail is square. It is found in the North and Baltic seas; it scarcely exceeds the length of a foot, and the thickness of a finger. Besides the appellation of needle fish and gar fish, it is sometimes called by that of a shorter pipe and horn fish.

The *Needle Fish* are natives of the ocean, and the North and Baltic seas. They are usually found in deep places near the coasts, where they are caught with other fish. They produce their young in a perfect state, one after the other, from eggs hatched in their bodies, like the sharks and rays. Having but little flesh they are fit only for baiting lines; and they are the more proper for this purpose as they are tenacious of life; and it is well known that fish bite more eagerly at a living bait than a dead one.

The *Sea Adder*, or little pipe, is nearly round, having only some very small and scarcely perceptible angular projections on the sides. It has but one fin; and the body is divided into joints, like that of the common worm. It grows to the length of two feet, and is not thicker than a swan's quill. It inhabits the North and Baltic seas, and is of the same nature as the two former fish.

The *Long File Fish*.—The body of the long file fish is not very deep; the

The Hippocampus, which, from the form of its head, some call the Seahorse, never exceeds nine inches in length. It is about as thick as a man's thumb, and the body is said, while alive, to have hair on the fore-part, which falls off when it is dead. The snout is a sort of a tube with a hole at the bottom, to which there is a cover, which the animal can open and shut at pleasure. Behind the eyes there are two fins which look like ears; and above them are two holes which serve for respiration. The whole body seems to be composed of cartilaginous rings, on the intermediate membranes of which several small prickles are placed. It is found in the Mediterranean, and also in the Western Ocean; and, upon the whole, more resembles a great caterpillar than a fish. The ancients considered it as extremely venomous; probably induced by its peculiar figure.

From these harmless animals, covered with a slight coat of mail, we may proceed to others, more thickly defended, and more formidably armed, whose exact station in the scale of fishes is not yet ascertained. While Linnæus ranks them among the cartilaginous kinds, a later naturalist places them among the spinous class. With which tribe they most agree, succeeding

skin is divided by smooth furrows, with small rough scale-like spaces: each of these, on the sides, have a small spine pointing towards the tail; the first dorsal fin has three spines, the first of which is very large, and rough in front like a file, and hence the English name; the third very short, and situated at a considerable distance from the other two; the skin at the back and belly, at the base of the dorsal and anal fins drawn out and compressed; pectoral fins small; dorsal and anal fins triangular, and situate nearly opposite each other; the tail even at the end. A singular property is possessed by the first dorsal fin of this fish, which is, that no force can depress the first spine; but if the last be depressed in ever so gentle a manner, the other two immediately fall down upon it, and as instantaneously as when a cross-bow is let off by pulling the trigger. One sort found in the Mediterranean, near Rome, is on that account called *pisce balestra*, the cross-bow fish.

There is another species, mentioned by Walcott, the body of which is much compressed and deep; the rays of the first dorsal fin, spiny; the first ray very long and rough; first dorsal fin, and the back from its base, black; skin rough; tail rough; and in the place of each ventral fin a long rough spine. Also another species, (named hispidus by naturalists,) is found in Carolina; the head fin of which is not radiated, and there is a round black spot in the tail fin. The body is rough, and bristly towards the tail. The spine, or horn, is situated between the eyes; and instead of a belly fin it has a jagged sharp spine. Several more species, or varieties, are found in the Indian ocean, and at Ascension island, all which, together with the unicorn, go by the general name of the belestes.

observations must determine. At present we seem better acquainted with their figure than their history: their deformity is obvious; and the venomous nature of the greatest number, has been confirmed by fatal experience.—This circumstance, as well as the happy distance at which they are placed from us, being all found in the Oriental or American seas, may have prevented a more critical inquiry; so that we know but little of the nature of their malignity, and still less of their pursuits and enmities in the deep.

In the first of this tribe we may place the Sea Orb, which is almost round, has a mouth like a frog, and is from seven inches to two feet long. Like the porcupine, from whence it sometimes takes its name, being also called the Sea Porcupine, it is covered over with long thorns or prickles, which point on every side; and, when the animal is enraged, it can blow up its body as round as a bladder. Of this extraordinary creature there are many kinds: some threatening only with spines, as the Sea Hedgehog; others defended with a bony helmet that covers the head, as the Ostracion; others with a coat of mail from the head to the tail, where it terminates in a point, as the Centriscus; and others still armed offensively and defensively with bones and spines, as the Shield Orb.*

* *The Eared Ostracion*.—This fish has a brown spine over each eye, two on each side of the back, the same on each side of the abdomen, and one on each side of the body. Its teeth are cylindrical, blunt, and pointing forwards. The whole body is mailed with a complete bony covering. This species is found about the islands of the Pacific ocean, and is readily distinguished from the rest of its cogeners. Its length is about four inches and a half.

The Lineated Tetrodon.—The jaws are bony, and divided at the tip; the body is roughened beneath, and the ventral fins wanting; the abdomen is variegated by longitudinal brown bands. This singular fish, which is a native of the Mediterranean sea, is also said to be sometimes found in the river Nile. Like many others of its genus, it has a power of inflating at pleasure the skin of its body; and being covered on the abdomen with numerous small spines, is said to inflict considerable pain on the hands of those who incautiously touch it. It grows to the length of from eight to ten inches.

The Orbicular Diadon.—This remarkable fish grows about a foot in length, and is a native of the tropical seas. It is of a rounder shape than the Diadon Hystriæ, or Porcupine Diadon: its jaws are bony, and undivided; and the body beset with moveable spines. The spines are much shorter than the porcupine diadon, with broader bases, forming a kind of curved reticular pattern on the skin.

The Scaly Centriscus.—The head of this fish is produced into a very nar-

Of these scarcely one is without its peculiar weapon of offence. The centriscus wounds with its spine; the ostracion poisons with its venom; the orb is impregnable, and is absolutely poisonous if eaten. Indeed, their figure is not such as would tempt one to make the experiment; and the natives of those countries where they are found, are careful to inform foreigners of their danger: yet a certain sailor at the Cape of Good Hope, not believing what the Dutch told him concerning their venom, was resolved to make the experiment, and break through a prejudice, which, he supposed, was founded on the animal's deformity. He tried, and ate one; but his rashness cost him his life; he instantly fell sick, and died a few days after.

These frightful animals are of different sizes; some not bigger than a foot-ball, and others as large as a bushel. They almost all flatten and erect their spines at pleasure, and increase the terrors of their appearance in proportion to the approach of danger. At first they seem more inoffensive; their body oblong, with all their weapons pointing towards the tail; but, upon being provoked or alarmed, the body, that before seemed small, swells to the view; the animal visibly grows rounder and larger, and all its prickles stand upright, and threaten the invader on every side. The Americans often amuse themselves with the barren pleasure of catching these frightful creatures by a line and hook, baited with a piece of sea-crab. The animal approaches the bait with its spines flattened; but when hooked and stopped by the line, straight all its spines are erected; the whole body being armed in such a manner at all points, that it is

row snout; its mouth is toothless, with the lower jaw longer than the upper one. The gill-openings are wide; its body is compressed, with the abdomen carinated; and the ventral fins united.

The Scaly Centriscus or Bellows Fish is a native of the Mediterranean sea, and grows to the length of five or six inches: it feeds on worms, and the smaller kinds of marine insects.

The Telescope Fish.—The whole body of this fish, and the ground colour of the fins, is of a beautiful red, darker towards the back, and lighter towards the belly: the membranes of the fins are almost white; and the red rays shining through them have a very fine effect; the three white points of the tail give you an idea of a trident or tulip. The head is short, but large; the mouth is small; the nostrils single. The pupil of the eye is black, the iris yellow; the back is round; the lateral line nearer the back than the head. The scales on the belly are large; the rays of the fins are ramified. This beautiful fish is found in the fresh waters of China, and is supposed be a variety of the gold fish.

impossible to lay hold of it on any part. For this reason it is dragged to some distance from the water, and there it quickly expires. In the middle of the belly of all these there is a sort of bag or bladder filled with air, and by the inflation of which the animal swells itself in the manner already mentioned.

In describing the deformed animals of this class, one is sometimes at a loss whether it be a fish or an insect that lies before him. Thus the hippocampus and the pipe-fish bear a strong resemblance to the caterpillar and the worm; while the lesser orb bears some likeness to the class of sea-eggs to be described after. I will conclude this account of cartilaginous fishes with the description of an animal which I would scarcely call a fish, but that Father Labat dignifies it with the name. Indeed, this class teems with such a number of odd-shaped animals, that one is prompted to rank every thing extraordinary of the finny species among the number: but besides, Labat says, its bones are cartilaginous, and that may entitle it to a place here.

The animal I mean is the Galley Fish, which Linnæus degrades into the insect tribe, under the title of *the Medusa*, but which I choose to place in this tribe, from its habits, that are somewhat similar. To the eye of an unmindful spectator, this fish seems a transparent bubble swimming on the surface of the sea, or like a bladder variously and beautifully painted with vivid colours, where red and violet predominate, as variously opposed to the beams of the sun. It is, however, an actual fish; the body of which is composed of cartilages, and a very thin skin filled with air, which thus keeps the animal floating on the surface, as the waves and the winds happen to drive. Sometimes it is seen thrown on the shore by one wave, and again washed back into the sea by another. Persons who happen to be walking along the shore often happen to tread upon these animals; and the bursting of their body yields a report like that when one treads upon the swim of a fish. It has eight broad feet, with which it swims, or which it expands to catch the air as with a sail. It fastens itself to whatever it meets by means of its legs, which have an adhesive quality. Whether they move when on shore, Labat could never perceive, though he did every thing to make them stir; he only saw that it strongly adhered to whatever substances he applied it. It is very common in America, and grows to the size of a goose-egg, or somewhat

more. It is perpetually seen floating; and no efforts that are used to hurt it can sink it to the bottom. All that appears above water is a bladder clear and transparent as glass, and shining with the most beautiful colours of the rainbow. Beneath, in the water, are four of the feet already mentioned, that serve as oars, while the other four are expanded above to sail with. But what is most remarkable in this extraordinary creature, is the violent pungency of the slimy substance with which its legs are smeared. If the smallest quantity but touch the skin, so caustic is its quality, that it burns it like hot oil dropped on the part affected. The pain is worst in the heat of the day, but ceases in the cool of the evening. It is from feeding on these that he thinks the poisonous quality contracted by some West Indian fish may be accounted for. It is certain these animals are extremely common along all the coasts in the Gulf of Mexico; and whenever the shore is covered with them in an unusual manner, it is considered as a certain forerunner of a storm.

BOOK III.

OF SPINOUS FISHES.

CHAP. I.

THE DIVISION OF SPINOUS FISHES.

THE third general division of fishes is into that of the spinous or bony kind. These are obviously distinguished from the rest by having a complete bony covering to their gills ; by their being furnished with no other method of breathing but gills only ; by their bones, which are sharp and thorny ; and their tails, which are placed in a situation perpendicular to the body. This is that class which alone our later naturalists are willing to admit as fishes. The cetaceous class with them are but beasts that have taken up their abode in the ocean ; the cartilaginous class are an amphibious band, that are but half denizens of that element : it is fishes of the spinous kind that really deserve the appellation.

This distinction the generality of mankind will hardly allow ; but whatever be the justice of this preference in favour of the spinous class, it is certain that the cetaceous and cartilaginous classes bear no proportion to them in number. Of the spinous classes are already known above four hundred species ; so that the numbers of the former are trifling in comparison, and make not above a fifth part of the finny creation.

From the great variety in this class, it is obvious how difficult a task it must have been to describe or remember even a part of what it contains. When six hundred different sorts of animals offer themselves to consideration, the mind is bewildered in the multiplicity of objects that all lay some claim to its attention. To obviate this confusion, systems have been devised, which

throwing several fishes that agree in many particulars into one group, and thus uniting all into so many particular bodies, the mind that was incapable of separately considering each, is enabled to comprehend all, when thus offered in larger masses to its consideration.

Indeed, of all the beings in animated nature, fishes most demand a systematical arrangement. Quadrupeds are but few, and can be all known; birds, from their seldom varying in their size, can be very tolerably distinguished without system; but among fishes, which no size can discriminate, where the animal ten inches, and the animal ten feet long, is entirely the same, there must be some other criterion by which they are to be distinguished; something that gives precision to our ideas of the animal whose history we desire to know.

Of the real history of fishes, very little is yet known; but of very many we have full and sufficient accounts, as to their external form. It would be unpardonable, therefore, in a history of these animals, not to give the little we do know; and, at least, arrange our forces, though we cannot tell their destination. In this art of arrangement, Artedi and Linnæus have long been conspicuous: they have both taken a view of the animal's form in different lights; and, from the parts which most struck them, have founded their respective systems.

Artedi, who was foremost, perceiving that some fishes had prickly fins, as the pike; that others had soft pliant ones, as the herring; and that others still wanted that particular fin by which the gills are opened and shut, as the eel, made out a system from these varieties. Linnæus, on the other hand, rejecting this system, which he found liable to too many exceptions, considered the fins not with regard to their substance, but their position. The ventral fins seem to be the great object of his system; he considers them in fishes supplying the same offices as feet in quadrupeds; and from their total absence, or from their being situated nearer the head or the tail, in different fishes, he takes the differences of his system.

These arrangements, which are totally arbitrary, and which are rather a method than a science, are always fluctuating; and the last is generally preferred to that which went before. There has lately appeared, however, a system composed by Mr Gouan, of Montpellier, that deserves applause for more than its novelty.

It appears to me the best arrangement of this kind that ever was made; and in it the divisions are not only precisely systematical, but, in some measure, adopted by Nature itself. This learned Frenchman has united the systems of Artedi and Linnæus together; and, by bringing one to correct the other, has made out a number of tribes that are marked with the utmost precision. A part of this system, however, we have already gone through in the cartilaginous, or, as he calls a part of them, the *branchios-tegous* tribe of fishes. In the arrangement of these, I have followed Linnæus, as the number of them was but small, and his method simple. But in that which is more properly called the *spinous class of fishes*, I will follow Mr Gouan's system; the terms of which, as well as of all the former systems, require some explanation. I do not love to multiply the technical terms of a science; but it often happens that names, by being long used, are as necessary to be known as the science itself.

If we consider the substance of the fin of a fish, we shall find it composed, besides the skin, either of straight, hard, pointed, bony prickles or spines, as in the pike; or of soft, crooked, or forked bones, or cartilages, as in the herring.—The fish that have bony prickly fins, are called *prickly-finned fish*; the latter, that have soft, or cartilaginous fins, are called *soft-finned fish*. The prickly-finned fish have received the Greek new-formed name of *Acanthopterigii*; the soft-finned fish have likewise their barbarous Greek name of *Malacopterigii*. Thus far Artedi has supplied Mr Gouan with names and divisions. All spinous fish are divided into prickly-finned fish and soft-finned fish.

Again, Linnæus has taught him to remark the situation of the fins; for the ventral, or belly-fins, which are those particularly to be remarked, are either wholly wanting, as in the eel, and then the fish is called *Apodal* (a Greek word, signifying without feet); or the ventral-fins are placed more forward than the pectoral-fins, as in the haddock, and then the animal is a *Jugular-fish*; or the ventral-fins are placed directly under the pectoral-fins, as in the father-lasher, and then it is called a *Thoracic-fish*; or, lastly, the ventral-fins are placed nearer the tail than the pectoral-fins, as in the minnow, and then it is an *Abdominal-fish*.

Possessed of these distributions, the French naturalist mixes and unites them into two grand divisions. All the prickly-finned fish make one general division; all the soft-finned fish another.

These first are distinguished from each other, as being either *apodal*, *jugular*, *thoracic*, or *abdominal*. Thus there are prickly-finned *apodal* fishes ; prickly-finned *jugular* fishes ; prickly-finned *thoracic* fishes ; and prickly-finned *abdominal* fishes. On the other hand, the soft-finned fishes fall under a similar distribution, and make the other general division. Thus there are soft-finned *apodal* fishes, soft-finned *jugular* fishes, soft-finned *thoracic* fishes, and soft-finned *abdominal* fishes. These general characters are strongly marked, and easily remembered. It only remains, therefore, to divide these into such tribes as are most strongly marked by nature ; and to give the distinct characters of each to form a complete system with great simplicity. This Mr Gouan has done ; and the tribes into which he has distributed each of these divisions, exactly amount to fifty. Thus the reader, who can contain in his memory the characteristic marks of fifty kinds will have a tolerable idea of the form of every kind of spinous fish. I say, of the form ; for as to the history and nature of the animal itself, that can only be obtained by experience and information.

SECT. I.

PRICKLY-FINNED FISHES.

Prickly-finned Apodal Fish.

1. THE *Trichurus*. The body of a sword-form ; the head oblong ; the teeth sword-like, bearded near the points ; the fore-teeth largest ; the fin that covers the gills with seven spines ; the tail ending in a point without fins ; an inhabitant near the Oriental and American shores ; of a silvery white ; frequently leaping into the fishermen's boats in China.

2. The *Xiphias*, or *Sword-fish*. The body round ; the head long ; the upper-jaw terminating by a long beak, in form of a sword ; the fin that covers the gills with eight spines ; an inhabitant of Europe ; an enemy to the whale.*

* Sword-fish are very large and powerful animals, often growing to the length of twenty feet and upwards. Their voracity is unbounded, for they

3. The *Ophidium* or *Gilthead*. The body sword-like; the head blunt; the fin covering the gills with seven spines; the opening of the mouth side-ways; the fins of the back, the anus, and the tail, all joining together; the most beautiful of all fishes, covered over with green, gold, and silver; it is by sailors called the dolphin, and gives chase to the flying-fish.

attack and destroy almost every thing living that comes in their way. The larger fish they penetrate with their long snout, few of which, when within sight of them, can either withstand or avoid its shock. There are but two species, one of which is only found in the European seas; the other, called the Indian, or broad-finned sword-fish, inhabits the Brazilian and East Indian seas, and also the Northern ocean. The body of a silvery bluish white, except the upper parts of the back, and the head and tail, which are of a deep brown. The skin is smooth, and without any appearance of scales. From the long sharp-pointed process in front of the head, it would seem, on a cursory view, to be allied to the European species; but it differs from this in having an extremely broad back fin, and two long sharp-pointed appendages proceeding from the thorax.

In 1725, when his Majesty's ship *Leopard*, after her return from the coast of Guinea and the West Indies, was ordered to be cleaned and re-fitted for the channel service, in stripping off her sheathing the shipwrights found in her bottom, pointing in a direction from the stern towards the head, part of the sword or snout of one of these fish. On the outside this was rough, not unlike seal-skin; and the end, where it was broken off, appeared like a coarse kind of ivory. The fish, from the direction in which the sword lay, is supposed to have followed the ship when under sail. It had penetrated through her sheathing, which was an inch thick; passed through three inches of plank, and beyond that four inches into the timber. The force requisite to effect this (since the vessel sailed in a direction from the fish,) must have been excessively great, especially as no shock was felt by the persons on board. The workmen on the spot, declared it impossible, with a hammer of a quarter of a hundred weight, to drive an iron pin of the same form and size into that wood, and to the same depth, in less than nine strokes, whilst this had been effected by only one.

A letter was written to Sir Joseph Banks, as president of the Royal Society, from the captain of an East India-man, about thirty years ago, accompanied with an account of another instance of the amazing strength which this fish occasionally exerts: the bottom of this ship having been pierced through in such a manner, that the sword was completely embedded or driven through its whole length, and the fish killed by the violence of the effort. A part of the bottom of the vessel, with the sword embedded in it, is now lodged in the British Museum.

The sword-fish and the whale are said never to meet without coming to battle; and the former has the repute of being always the aggressor. Sometimes two of them join against one whale, in which the combat is by no means equal. When the whale discovers the sword-fish darting upon him, he dives to the bottom, but is closely pursued by his antagonist, who compels him again to rise to the surface.

Prickly-finned Jugular Fish.

4. The *Trachinus* or *Weever*. The body oblong; the head obtuse; the bones covering the gills jagged at the bottom; the fins covering the gills with six spines; the anus near the breast; buries itself in the sands, leaving only its nose out; and if trod upon, immediately strikes with the spines that form its dorsal fins, which are venomous and dangerous.

5. The *Uranoscopus*. The body wedge-like; the head almost round, and larger than the body; the mouth flat; the eyes on the top of the head; the fin covering the gills with six spines; the anus in the middle of the body; an inhabitant of the Mediterranean Sea.

6. The *Cullyonymus* or *Dragonet*. The body almost wedge-like; the head broad, and larger than the body; the mouth even with the body; the bony covering of the gills close shut; the opening to the gills behind the head; the fin covering the gills with six spines; an inhabitant of the Atlantic Ocean.

7. The *Blennius* or *Blenny*. The body oblong; the head obtusely bevel; the teeth a single range; the fin covering the gills with six spines; the ventral-fins have two small blunt bones in each; a species of this animal is viviparous.

Prickly-finned Thoracic Fish.

8. The *Gobius* or *Gudgeon*. The body round and oblong; the head with two little holes between the eyes, one before the other; the fin covering the gills with four spines; the ventral-fins joined together.*

9. The *Cepola*. The body sword-like; the head blunt; the mouth flat; the fin covering the gills with six spines; the fins distinct; an inhabitant of the Mediterranean Sea.

* There is another species, called the *Scorpio* or *Father-lasher*, which is not uncommon on the rocky coasts of this island; it lurks under stones, and will take a bait. It seldom exceeds eight or nine inches in length. The head is large, and has a most formidable appearance, being armed with vast spines, which it can oppose to an enemy that attacks it, by swelling out its cheeks and gill-covers to a large size. The nose and space contiguous to the eyes are furnished with sharp spines; the covers of the gills are terminated by exceeding long ones, which are strong, and very sharp-pointed. The mouth is large: the jaws covered with very small teeth: the roof of the mouth is furnished with a triangular spot of very minute teeth.

10. The *Coryphæna* or *Razor-fish*. The body wedge-like; the head very bevel; the fin covering the gills with five spines.

11. The *Skomber* or *Mackarel*. The body oblong; the line running down the side zigzagged towards the tail; the head sharp and small; the fins covering the gills with seven spines; several false fins towards the tail.*

12. The *Labrus* or *Wrasse*. The body oval; the head middling; the lips doubled inward; both cutting and grinding teeth; the covers of the gills scaly; the fin covering the gills with five spines; the pectoral fins pointed.

13. The *Sparus* or *Sea-bream*. The body oblong; the head middling; the lips not inverted; the teeth cutting and grinding; the cover of the gills scaly; the fins covering the gills with five rays; the pectoral fins pointed.

14. The *Chatodon* or *Cat-fish*. The body oblong; the head

* The *Thunny*.—These fish are from two to ten feet in length. The body is round and thick, and tapers nearly to a point both at the head and tail. The skin of the back is very thick and black, and that of the sides and belly silvery, tinged with light blue and pale purple. The tail is crescent-shaped, with the tips far asunder; and the spurious fins between the dorsal fin and the tail (which mark the species) are from eight to eleven in number. On the coasts of Sicily, as well as in several other parts of the Mediterranean, there are very considerable thunny fisheries. The nets are spread over a large space of sea by means of cables fastened to anchors, and are divided into several compartments. A man placed upon the summit of a rock high above the water, gives the signal of the fish being arrived; for he can discern from that elevation what passes under the water, much better than any person near the surface. As soon as notice is given that a shoal of fish has penetrated as far as the inner compartment of the net, the passage is drawn close, and the slaughter begins. The thunnies enter the Mediterranean about the vernal equinox, travelling in a triangular phalanx, so as to cut the water with its point, and to present an extensive base for the tides and currents to act against, and impel forwards. They repair to the warm seas of Greece to spawn, steering their course thither along the European shores; but as they return they approach the African coast; the young fry is placed in the van of the squadron as they travel. They come back from the east in May, and abound at that time on the coast of Sicily and Calabria. In autumn they steer northward, and frequent the neighbourhood of Amalphi and Naples. They are not uncommon on the western coasts of Scotland, where they come in pursuit of the herrings, and often during the night strike into the nets, and do considerable damage. When the fishermen draw up these in the morning, the thunny rises at the same time towards the surface, ready to catch the fish that drop out. On its being observed, a line is thrown into the water, having a strong hook baited with a herring, which it seldom fails to seize. As soon as the fish finds itself ensnared, it loses all its active powers, and after very little resistance submits to its fate.

small ; the teeth slender and bending ; the fin covering the gills with three to six spines ; the fins of the back and anus scaly.

15. The *Sciæna*. The body nearly elliptical ; the head bevel, the covers of the fins scaly ; the fin covering the gills with six rays ; the fins of the back jagged, and hidden in a furrow in the back.

16. The *Perch*. The body oblong ; the head bevel ; the covers of the gills scaly and toothed ; the fin covering the gills with seven spines ; the fins in some jagged.

17. The *Scorpena* or *Father-lasher*. The body oblong ; the head great, with beards ; the covers of the gills armed with prickles ; the fin covering the gills with seven spines.

18. The *Mullus* or *Surmulet*. The body slender ; the head almost four-cornered ; the fin covering the gills with three spines ; some of these have beards ; a fish highly prized by the Romans, and still considered as a very great delicacy.

19. The *Trigla* or the *Gurnard*. The body slender ; the head nearly four-cornered, and covered with a bony coat, the fin covering the gills with seven spines ; the pectoral and ventral fins, strengthened with additional muscles and bones, and very large for the animal's size.

20. The *Cottus* or *Bull-head*. The body wedge-like ; the head flat and broader than the body ; the fin covering the gills with six spines ; the head furnished with prickles, knobs, and beards.

21. The *Zeus* or *Doree*. The body oblong ; the head large, bevel ; the fin covering the gills with seven rays ; the fins jagged ; the upper-jaw with a loose floating skin depending into the mouth.

22. The *Trachipterus* or *Sabra*. The body sword-like ; the head bevel ; the fin covering the gills with six spines ; the lateral line straight ; the scales in a single order ; a loose skin in both the jaws.

23. The *Gasterosteus* or *Stickleback*. The body broadest towards the tail ; the head oblong ; the fin covering the gills with three, six, or seven spines ; prickles starting backward before the back fins and the fins of the anus.*

* *The fifteen-spined Stickleback or Great Stickleback*.—This fish, which is the largest species of the sticklebacks, is slender, being only an inch thick, and nine in length : the snout is long ; and the body of a pentagonal figure towards the tail, which is flat. The mouth is small, and the upper jaw pro-

Prickly-finned Abdominal Fish.

24. The *Silurus* or *Sheath-fish*. The body oblong; the head large; the fin covering the gills from four to fourteen spines; the leading bones or spines in the back and pectoral fins toothed.

25. The *Mugil* or *Mullet*. The body oblong; the head almost conical; the upper-jaw with a furrow, which receives the prominence of the under; the fin covering the gills with seven rays.

26. The *Polynemus*. The body oblong; the head with a beak; the fin covering the gills with from five to seven spines; the bones that move the pectoral fins not articulated to those fins.

27. The *Teuthys*. The body almost elliptical; the head abruptly shortened; the fin covering the gills with five rays; the teeth in a single row, close, strong, and even.

28. The *Elops* or *Sea-Serpent*. The body slender; the head large; the fin covering the gills double, with thirty spines, and armed externally with five bones resembling teeth.

jects beyond the lower. The gills and the bony plate on the belly are brown upon the upper part, silvery and streaked upon the lower. It has two pectoral fins, one dorsal rising in a triangular form from the middle of the back; between this and the head are fifteen distinct spines inclined towards the tail, which, when depressed, are insensible to the touch. The fins of the belly consist of two spines, the foremost of which is the longest. In the fin at the anus there is also a covered spine, but the other fins are soft and ramified. The fifteen-spined sticklebacks, like the last mentioned species, are found in the Baltic sea and the German ocean; they are very common in Holland, and also near Lubeck in the dutchy of Holstein. M. Bloch says, that their ordinary size does not exceed seven inches, and that he has found small crabs in their stomach. The great stickleback does not ascend the rivers like the other kinds, never leaving the sea, where it is taken among other fish. Large quantities are sometimes taken by kindling a fire on the shore, which draws them in shoals to the nets. A kind of lamp oil is extracted from them, and what remains is used as manure. They are, however, frequently eaten by the poor.

SECT. II.

SOFT-FINNED FISHES.

Soft-finned Apodal Fish.

29. The *Muræna* or *Eel*. The body round and slender ; the head terminating in a beak ; the fin covering the gills with ten rays ; the opening to the gills pipe-fashion, placed near the pectoral fins ; the fins of the back, the anus, and the tail, united in one.

30. The *Gymnotus* or *Carapo*. The body roundest on the back, like the blade of a knife ; the head small ; the fin covering the gills with five rays ; the back without a fin ; two beards or filaments from the upper lip ; an inhabitant of Brazil.*

31. The *Anarhicas* or *Wolf-fish*. The body roundish and slender ; the head large and blunt ; the fore-teeth above and

* *Electric Eels*.—It is not only the crocodile and jaguar which in America lie in ambush for the horse, but even among fishes this animal has a dangerous enemy. The marshy waters of Bera and Rastro are filled with the electric eel, whose slimy yellow-spotted body sends forth at will terrible shocks. These gymnotes are from five to six feet long, and sufficiently strong to kill the most robust animals, when they bring their organs properly into action. At Uritucu they have been obliged to change the direction of the road, because the number of these eels had so much increased in a little river, that annually a number of horses in passing the ford were killed. All animals of their own element fly from these formidable eels ; even man is surprised, when angling in the river, and receives the fatal shock by means of the wetted line. The fishing for the gymnote presents a picturesque spectacle. The Indians inclose a marshy spot and then drive horses and mules into the water, until the noise excites these courageous fishes to the attack. They are seen swimming on the surface like snakes, and adroitly insinuating themselves under the belly of the horses, many of which fall under the violence of these invisible blows, while others, panting with streaming mane and haggard eyes, expressive of anguish, strive to evade the storm which threatens them ; but the Indians, armed with long bamboos, drive them back again into the middle of the water. The impetuosity of this unequal combat at length diminishes. The gymnotes, fatigued, disperse, like clouds deprived of the electric fluid, and require long repose and abundant nourishment to repair the loss of the galvanic force. Their strokes, getting feebler and feebler, produce a less sensible effect, until frightened at length by the trampling of the horses, they timidly approach the banks, and are then struck with harpoons by the Indians, and subsequently pulled on the steppe with dry sticks, non-conductors of the fluid.

below conical ; the grinding teeth and those in the palate round the fin covering the gill has seven rays.

32. The *Stromateus*. The body oblong ; the head small the teeth moderately sharp ; the fin covering the gills with five or six rays.

33. The *Ammodytes* or *Launce*. The body slender and roundish ; the head terminated by a beak ; the teeth of a hair-like fineness ; the fin covering the gills with seven rays.

Soft-finned Jugular Fish.

34. The *Lepidogaster*. The body wedge-like ; the head oblong, forwarder than the body, flattish, the beak resembling that of a duck ; the pectoral fins double, two on each side ; the ventral-fins joined together ; a kind of bony breast-plate between the pectoral fins ; the fin covering the gills with five rays ; the opening to the gills pipe-fashion.

35. The *Gadus* or *Cod-fish*. The body oblong ; the head wedge-like ; the fin covering the gills with seven-rays ; several back and anal fins.*

Soft-finned Thoracic Fish.

36. The *Pleuronectes* or *Flat-fish*. The body elliptical ; the

* *The Haddock*.—This well-known fish is a species of the cod ; it has a bearded mouth, and three fins on the back ; the upper jaw longest, and the tail a little forked. On each side of the body, just beyond the gills, there is a dark spot, which the superstitious assert is the impression of St Peter's finger and thumb, when he took the tribute money (at the command of his Master) out of the mouth of a fish of this species, and which has ever since been continued to the whole race of haddocks.

Haddocks seldom grow to any great size ; they very rarely become so large as to weigh twelve or fourteen pounds : they are esteemed more delicate eating when they do not exceed three pounds in weight. These fish, during stormy weather, are said to take shelter in the sand or mud, or among the sea-weeds. They feed on various small marine animals, and frequently become fat on herrings. The females deposit their spawn on the sea-weeds near the shore. The larger ones begin to be in roe in November, and continue so for somewhat more than two months : from this time till May they are reckoned out of season, and are not good. They then begin to recover. The small ones are extremely good from May till February ; and those that are not old enough to breed, for even two months longer.

The whiting is another species of the cod, but without a beard.

head small ; both eyes on one side of the head ; the fin covering the gills with from four to seven rays.

37. The *Echineis* or *Sucking-fish*. The body almost wedge-like, moderately round ; the head broader than the body ; the fin

* To this division the Turbot, Sole, Flounder, Plaice, Dab, &c. belong. Turbots have sometimes been known to weigh from twenty-five to thirty pounds. Their general form is somewhat square. The upper parts of the body and fins are cinereous, with dark spots ; and the under parts white : on the upper parts there are numerous short and blunt spines. The eyes are on the left side of the head.

The northern parts of the English coast, and some places off the coast of Holland, afford turbot in great abundance, and in greater excellence there than any other parts of the world. Lying here, however, in deep waters, they are seldom to be caught but by lines. In fishing for turbot off the Yorkshire coast, three men go out in each of the boats, each man provided with three lines, every one of which is furnished with two hundred and eighty hooks, baited and placed exactly six feet two inches asunder. These are coiled in an oblong piece of wicker-work, with the hooks baited and placed very regularly in the centre of the coil. When they are used, the nine are generally fastened together, so as to form one line with about two thousand hooks, and extending nearly three miles in length. This is always laid across the current. An anchor and a buoy are fixed at the end of each man's line. The tides run here so rapidly, that the fishermen can only shoot and haul their lines in the still water, at the turn of the tide ; and therefore as it is flood and ebb about every alternate six hours, this is the longest time the lines can remain on the ground. When the lines are laid, two of the men usually wrap themselves in the sail and sleep, whilst the third is on watch to prevent their being run down by ships. The voracity of the turbot in pursuit of its prey is oftentimes such, that it carries them into the mouths of rivers, or the entrance of ponds in salt marshes, which communicate with the sea. But they are not contented with merely employing agility and strength in the procuring of their prey, they likewise have recourse to stratagem. They plunge themselves into the mud or sand at the bottom of the sea, and cover their whole body, except their eyes and mouth. Thus concealed, they seize upon, and devour all the smaller kinds of fish which incautiously approach them. It is said they are very particular in the choice of their food, refusing, invariably, all except living animals, or such as are not in the least degree putrid. And the fishermen assert, that they are never to be caught with baits which have been bitten by other fish. The Holibut has been known to attain so great a weight as between two and three hundred pounds. Its general shape is long and narrow. The upper parts are dusky ; and the under parts white. The skin is smooth, and destitute of spines. The eyes on the right side of the head.

The Sole.—This well-known and delicious fish is remarkable for one very extraordinary circumstance ; among various other marine productions, they have been known to feed on shell fish, although they are furnished with no apparatus whatever in their mouth for reducing them to a state calculated for digestion. Some that were purchased by Mr Collinson, (as his letter inserted in the philosophical Transactions states,) had their bellies hard and

covering the gills with ten rays ; an oval breast-plate, streaked in form of a ladder, toothed.*

38. The *Lipidopus* or *Gartar-fish*. The body sword-like, the head lengthened out ; the fins covering the gills with seven rays ; three scales only on the whole body ; two in the place of the ventral fins ; and the third from that of the anus.

prominent, appeared to be filled with rows of some hard substance, which, on being opened, were found to be shell-fish. These, from the bulging of the shells and the intervening interstices, gave the intestines somewhat the appearance of strings of beads. On further examination, some of them were found nearly dissolved, others partly so, but many of them whole. The most usual food of soles is, the spawn and young of other fish. These fish are found on all of the British coasts ; but those of the western shores are much superior in size to what are taken in the north, since they are sometimes found of the weight of six or seven pounds. The principal fishery for soles is in Torbay.

The *Bearded Flounder*.—The eyes of this fish are both on the same side of the head. The body is compressed, one side representing the back, and the other the abdomen. The whole body is scattered with gray spots ; and it is bearded all round the fore part of the head. This fish is a native of the Indian and Red seas, measuring seven or eight inches in length. It seems to have been first considered a distinct species by Gronovius, but does not occur in the *Systema Naturæ* of Linnæus.

The *Plaice*.—Plaice are very flat, and much more square than the generality of flat-fish. Behind the left eye there is a row of six tubercles, that reaches to the commencement of the lateral line. The upper part of the body and fins are of a clear brown, marked with large bright orange-coloured spots ; the belly is white. These fish are very common on most of our coasts, and sometimes taken of the weight of fifteen pounds ; but they seldom reach that size, one of eight or nine pounds being reckoned a large fish. The best and largest are taken off Rye, on the coast of Sussex, and in Ireland ; also off the Dutch coasts. They are watery eating ; but are, notwithstanding, admired by some. They spawn in the beginning of February.

The *Dab* is found with the preceding species, but is less common. It is generally of a uniform brown colour on the upper side, though sometimes clouded with a darker. The scales are small and rough, which is a character of this species. The lateral line is extremely incurvated in the beginning, then goes quite straight to the tail. The lower part of the body is white. This fish is in best season during February, March, and April ; they spawn in May and June, and become flabby and watery the rest of the summer. They are superior in quality to the plaice and flounder, but rather inferior in size.

* The Sucking fish was believed by the ancients to have the power of arresting the progress of a vessel by adhering to its bottom. They are found adhering to the sides of sharks and other fish, and have been employed by the Indians in catching fish somewhat in the same manner as hawks are in seizing birds.

Soft-finned Abdominal Fish.

39. The *Loricaria*. The body crusted over; the head broad with a beak; no teeth; the fin covering the gills with six rays.

40. The *Atherina* or *Atherine*. The body oblong; the head of a middling size; the lips indented; the fin covering the gills with six rays; the line on the sides resembling a silver band.

41. The *Salmo* or *Salmon*. The body oblong; the head a little sharp; the fin covering the gills from four to ten rays; the last fin on the back, without its correspondent muscles, fat.*

* *The Salmon*.—The Salmon, which was known to the Romans, but not to the Greeks, is a soft-finned abdominal fish. It is distinguished from other fish by having two dorsal fins, of which the hindermost is fleshy and without rays: it has teeth both in the jaws and in the tongue; and the body is covered with round and minutely striated scales. The colour of the back and sides is gray, sometimes spotted with black, and sometimes plain; the covers of the gills are subject to the same variety; and the belly is silvery. The nose is sharp-pointed: and in the males the under jaw sometimes turns up in the form of a hook. Rapid and stony rivers, where the water is free from mud, are the favourite places of most of the salmon tribe, the whole of which is supposed to afford wholesome food for mankind. This fish seems confined in a great measure to the northern seas, being unknown in the Mediterranean, and in the waters of other climates. It lives in fresh, as well as in salt waters, forcing itself in autumn up the rivers, sometimes for hundreds of miles, for the purpose of depositing its spawn. It abandons the seas where it finds an abundant sustenance, ascends the rivers depopulated by man, endeavours by every kind of artifice to escape the snares of the fishermen, and all this solely for the purpose of finding a convenient place for depositing its eggs. In these peregrinations it is that salmon are caught in the great numbers that supply our markets and tables. Intent only on the object of their journey, they spring up cataracts and other obstacles of a very great height. This extraordinary power seems to be owing to a sudden jerk that the fish gives to its body from a bent into a straight position. When they are unexpectedly obstructed in their progress, it is said they swim a few paces back, survey the object for some minutes, motionless, retreat, and return again to the charge; then, collecting all their force, with one astonishing spring leap over every obstacle. Where the water is low, or sand-banks intervene, they throw themselves on one side, and in that position soon work themselves over into the deep water beyond. On the river Liffy, in Ireland, there is a cataract above nineteen feet high; here, in the salmon season, many of the inhabitants amuse themselves in observing the fish leap up the torrent. They frequently fall back many times before they surmount it; and baskets, made of twigs, are placed near the edge of the stream to catch them in their fall.

The Trout.—The general shape of the trout is rather long than broad: in several of the Scotch and Irish rivers, they grow so much thicker than those in England, that a fish from eighteen to twenty-two inches will often weigh

42. The *Fistularia*. The body angular, in form of a spindle; the head pipe-fashion, with a beak; the fin covering the gills with seven rays; the under jaw covering the upper.

43. The *Esox* or *Pike*. The body round; the head with : from three to five pounds. This is a fish of prey; has a short roundish head-blunt nose, wide mouth filled with teeth, not only in the jaws, but in the palate and tongue; the scales are small; the back of an ash-colour; the sides yellow; and, when in season, is sprinkled all over the body and covers of the gills with small beautiful red and black spots; the tail is broad. The female has a smaller head and deeper body than the male, and is of superior flavour. In fact, the colour of the trout and its spots vary greatly in different waters, and at different seasons.

This fish, although very delicate, and at present well known, was in no esteem among the ancients. It abounded in most of the lakes of the Roman empire, yet is only mentioned by writers on account of its beautiful colours.

In some rivers trouts begin to spawn in October, but November is the chief months of spawning. About the end of September they quit the deep water to which they had retired during the hot weather, and make great efforts to gain the course of the currents, seeking out a proper place for spawning. This is always on a gravelly bottom, or where gravel and sand are mixed among stones towards the end and sides of the streams. At this period they turn black about the head and body, and become soft and unwholesome. They are never good when they are big with roe, which is contrary to the nature of most other fish. They multiply very fast, though they produce much less spawn than any other fish, which is probably owing to the voracious fish in these cold streams where they reside; and they would be still more numerous, if they were not so greedy as to devour each other. After spawning they become feeble, their bodies are wasted, and those beautiful spots, which before adorned them, are imperceptible; their heads appear swelled, and their eyes are dull. In this state they seek still waters, and continue there sick, as is supposed, all the winter. There are in all trout rivers some barren female fish, which continue good throughout the winter.

These fish begin to leave their winter quarters in March, or sometimes earlier, if the weather be mild, and approach the shallows and tails of streams, where they cleanse and restore themselves. As they acquire strength they advance still higher up the rivers, till they fix on their summer residence; for which they generally choose an eddy behind a stone, a log, or bank, that projects into the water, and against which the current drives.

The varieties of the common trout are almost infinite; from the great lake trout, which weighs above 60 or 70 lbs. to the trouts of the little mountain brook, which is scarcely larger than the finger. The gilleroo trout and par, samlet or brandling may be considered as forming distinct species.

The *Salmon-trout*, so called from its resemblance to the two fish whose name it bears: it attains the size of a small salmon; is spotted in the same manner as the trout; and, like it, spawns in winter. Like the salmon it sometimes inhabits the sea, and sometimes the rivers; it likewise ascends into the latter to deposit its spawn. The salmon-trouts, however, do not

beak; the under jaw pierced longitudinally with small holes; the fin covering the gills with from seven to twelve rays.

44. The *Argentina* or *Argentine*. The body a little round and slender; the head with a beak, broader than the body; the fin covering the gills with eight rays; a spurious back-fin.

45. The *Clupea* or *Herring*. The body a little oblong; the head with a small beak; the fin covering the gills with eight rays.

46. The *Exocetus* or *Flying-fish*. The body oblong; the head almost three-cornered; the fin covering the gills with seven rays; the pectoral fins placed high, and as long as the whole body; the back-fin at the extremity of the back.

47. The *Cyprinus* or *Carp*. The body elongated, almost round; the head with a small beak; the hinder part of the bone covering the gills, marked with a crescent; the fin covering the gills with three rays.*

quit the sea so early as the salmon, being seldom seen in the rivers before the month of May. They spawn in the same manner as salmon, in November or December; but as the rivers are then frozen, they do not retire to the sea till after the thaw. Like all other fish of the same genus, they live upon aquatic insects, worms, and small fish, and are fond of rapid streams, with a bottom of sand and gravel. Their flesh is red, and well-tasted, particularly before the spawning season. Its quality depends, in a great measure, on the greater or less degree of purity of the streams in which the fish are taken; their colour and spots vary extremely from the same cause. They die soon after they are taken out of the water. Young salmon trout are known by the name of whitlings; and many have supposed them to be young salmon, which opinion has been proved to be ill-founded.

Salmon-trouts attain a considerable size, weighing sometimes eight or ten pounds. Dr Bloch describes one that was twenty inches in length, an inch and a half thick, and which weighed five pounds and three quarters. This gentleman discovered, that this fish, like several kinds of sea-fish, possesses the quality of emitting light in a dark place; and that the palate, tongue, gills, and eyes, were endowed with that property in an eminent degree. When touched with the finger, those parts cast a considerable light; and when any other part was rubbed with the same finger, that quality was likewise communicated to it. The luminous matter, the doctor imagines, is contained in the slimy substance which covers those parts; for the flesh does not afford the smallest appearance of light. He kept fish eight days, and this luminous property diminished in proportion as the viscous matter was dried up.

The *Grayling* is a scarce fish in England, and is not to be found in Scotland or Ireland. They frequent rivers of peculiar temperature or current.

* The *Common Carp*.—In their general habit these fish exhibit so great a degree of cunning, as to be sometimes called by the country people the River Fox. When attempted to be taken by a net, they will often leap

48. The *Cobitis* or *Loach*. The body oblong ; almost equally broad throughout ; the head small, a little elongated ; the eyes in the hinder part of the head ; the fin covering the gills from four to six rays : the covers of the gills closed below.

over it ; or immerse themselves so deep in the mud, as to suffer the net to pass over without touching them. They are also very shy of taking a bait ; but, during spawning-time, so intent are they on the business of depositing their ova, that they will suffer themselves to be handled by any one who attempts it. They breed three or four times in the year, but their first spawning is in the beginning of May. Carp are found in the slow rivers and stagnant waters of Europe and Persia ; and here principally in deep holes, under the roots of trees, hollow banks, or great beds of flags, &c. They do not often exceed four feet in length, and twenty pounds in weight ; but Jovius mentions some caught in the Lago de Como, in Italy, that weighed two hundred pounds each, and others have been taken in the Dneister five feet in length.

The *Tench*.—This, according to Artdi, is a species of the carp, and is thick and bulky in proportion to its length. The colour of the back is dusky ; the dorsal and ventral fins of the same colour ; the head, sides, and belly, are of a greenish cast, most beautifully mixed with gold, which is in its greatest splendour when the fish is in highest season. They love still waters, and are rarely found in rivers ; they are very foolish, and easily caught.

This is one of those fish that prefer foul and weedy waters ; and its haunts in rivers are chiefly amongst weeds, and in places well shaded with rushes. These fish thrive best in standing waters, where they lie under weeds near sluices and pond-heads. They are much more numerous in pools and pits than in rivers ; but those taken in the latter are far preferable for the table. They begin to spawn in June, and may be found spawning in some waters till September. The best season is from that time till the end of May.

These fish do not often exceed four or five pounds in weight. Mr Pennant, however, mentions one that weighed ten pounds. Tench are in great repute with us as delicious and wholesome food ; but in Guernsey they are considered bad fish, and in contempt called shoemaker. Gessner even says, that it is insipid and unwholesome. Like the barbel, it was unnoticed by early writers ; and Ausonius, by whom it was first mentioned, treats it with that disrespect which evinces the capriciousness of taste.

These fish are sometimes found in waters where the mud is excessively fetid, and the weeds so thick that a hand-net can hardly be thrust down. In these situations they grow to a large size, and their exterior becomes completely tinged by the mud. Their flavour from this, if cooked immediately on being taken out, is often very unpleasant ; but if they are transferred into clear water, they soon recover from the obnoxious taint. A tench was taken at Thornville-Royal in Yorkshire, in 1802, of such enormous size, and so singular in its shape, as rather to be accounted a *lusus nature* than a regular product. A piece of water which had been ordered to be filled up, and into which wood and rubbish had been thrown for some years, was directed to be cleared out. So little water remained, and in such quantity were the weeds and mud, that it was expected no fish would be

49. The *Amia* or *Bonito*. The body round and slender; the head, forehead, and breast, without skin; the fin covering the gills with twelve rays; two beards from the nose.

50. The *Mormyrus*. The body oblong; the head elongated; the fin covering the gills with a single ray; the opening to the gills is linear, and has no bone covering them.

Such is the system of Mr Gouan; by reducing to which any fish that offers, we can know its rank, its affinities, and partly its anatomy, all which make a considerable part in its natural history. But to show the use of this system still more apparently, suppose I meet with a fish, the name to me unknown, of which I desire to know something more. The way is first to see

found, except perhaps a few eels; but, greatly to the surprise of the persons employed, nearly two hundred brace of tench, and as many perch, were discovered. After the pond was supposed to be quite cleared, an animal was observed to be under some roots, which was conjectured to be an otter. The place was surrounded; and on making an opening, a tench was found of a most singular form, having literally taken the shape of the hole in which he had of course been many years confined. His length was four feet nine inches, his circumference two feet three inches, and his weight near twelve pounds. The colour was also singular, his belly being tinged with vermilion like that of a char. This extraordinary animal, after having been examined by many gentlemen, was carefully put into a pond. At first it merely floated, and after a while it swam gently away. When Mr Daniel produced his "Rural Sports" it was alive and well.

The *Chub*.—This fish, which is called cheven, nah, or, botling, very much resembles the carp, but is of a longer form. The body is oblong, rather round, and is of an equal thickness in the greater part of the slope; the scales are large; the irides silvery; the cheeks of the same colour; the head and back of a deep dusky green; the sides silvery, but in the summer yellow; the belly white; the pectoral fins of a pale yellow; the ventral and anal fins red; and the tail forked, of a brownish hue, but tinged with blue at the end. It is altogether a handsome fish, but in no esteem for the table, being very coarse, and when out of season full of small hairy bones: the roe however is very good; and this fish stewed as carp will, it is said, deceive a connoisseur. Its name is derived from the shape of the head, cop being an old English word for head; and the French and Italians know it by a name synonymous with ours. The haunts of these fish are rivers whose bottoms are of sand or clay, or which are bounded by clayey banks, in deep holes, under hollow banks, shaded by trees or weeds. They are also found in the Esk, a river noted for the crystalline clearness of its waters, flowing over a rocky bottom. These fish often float on the surface, and are sometimes found in deep waters, where the currents are strong. In ponds fed by a rivulet they grow to a large size. They seldom, however, exceed the weight of four or five pounds, though Salvianus speaks of them as increasing to eight or nine. They deposit their spawn in April; and are in great perfection during the months of December and January.

whether it be a cartilaginous fish, which may be known by its wanting fins to open and shut the gills, which the cartilaginous kinds are wholly without. If I find that it has them, then it is a spinous fish; and in order to know its kind, I examine its fins whether they be prickly or soft; I find them soft; it is therefore to be ranked among the soft-finned fishes. I then examine its ventral or belly fins, and finding that the fish has them, I look for their situation, and find they lie nearer to the tail than the pectoral fins. By this I find the animal to be a soft-finned abdominal fish. Then, to know which of the kinds of these fishes it is, I examine its figure and the shape of its head: I find the body rather oblong; the head with a small beak; the lower jaw like a saw; the fin covering the gills with eight rays. This animal must, therefore, be the herring, or one of that family, such as the pilchard, the sprat, the shad, or the anchovy. To give another instance: upon examining the fins of a fish to me unknown, I find them prickly; I then look for the situation of the ventral fins, I find them entirely wanting; this then must be a prickly-finned apodal fish. Of this kind there are but three: and by comparing the fish with the description, I find it either of the trichurus kind, the sword-fish, or the gilt-head. Upon examining also its internal structure, I shall find a very great similitude between my fish and that placed at the head of the family.

CHAP. II

OF SPINOUS FISHES IN GENERAL.

HAVING given a method by which Spinous Fishes may be distinguished from each other, the history of each in particular might naturally be expected to follow; but such a distinct account of each would be very disgusting, from the unavoidable uniformity of every description. The history of any one of this class very much resembles that of all the rest: they breathe air and water through the gills: they live by rapine, each devouring such animals as its mouth is incapable of admitting; and they propagate, not by bringing forth their young alive, as in the cetaceous tribes, nor by distinct eggs, as in the generality of the

cartilaginous tribes, but by spawn, or peas, as they are generally called, which they produce by hundreds of thousands. These are the leading marks that run through their whole history, and which have so much swelled books with tiresome repetition.

It will be sufficient therefore to draw this numerous class into one point of view, and to mark how they differ from the former classes; and what they possess peculiarly striking, so as to distinguish them from each other. The first object that presents itself, and that by which they differ from all others, are the bones. These, when examined but slightly, appear to be entirely solid; yet when viewed more closely, every bone will be found hollow, and filled with a substance less rancid and oily than marrow. These bones are very numerous, and pointed; and, as in quadrupeds, are the props or stays to which the muscles are fixed which move the different parts of the body.

The number of bones in all spinous fishes of the same kind, is always the same. It is a vulgar way of speaking to say, that fishes are at some seasons more bony than at others; but this scarcely requires contradiction. It is true indeed, that fish are at some seasons much fatter than at others: so that the quantity of the flesh being diminished, and that of the bones remaining the same, they appear to increase in number, as they actually bear a greater proportion.

All fish of the same kind, as was said, have the same number of bones: the skeleton of a fish, however irregularly the bones may fall in our way at table, has its members very regularly disposed; and every bone has its fixed place, with as much precision as we find in the orders of a regular fabric. But then spinous fish differ in the number of bones according to the species: for some have a greater number of fins by which they move in the water. The number in each is always in proportion to the number and size of these fins: for every fish has a regular apparatus of bones and muscles by which the fins are moved; and all those fish, where they are numerous or large, must, of consequence, be considerably bony. Indeed, in the larger fish, the quantity of flesh is so much, and the bones themselves are so large, that they are easily seen and separated; but in the smaller kinds with many fins, the bones are as numerous as in the great; yet being so very minute, they lurk almost in every part of the flesh, and are dangerous as well as troublesome to be eaten. In

a word, those fish which are large, fat, and have few fins, are found to be the least bony ; those which are small, lean, and have many fins, are the most bony of all others. Thus, for instance, a roach appears more bony than a carp, because it is leaner and smaller ; and it is actually more bony than an eel, because it has a greater number of fins.

As the spinous fish partake less of the quadruped in their formation than any others, so they can bear to live out of their own element a shorter time. In general, when taken out of the water they testify their change by panting more violently and at closer intervals, the thin air not furnishing their gills the proper play ; and in a few minutes they expire. Some indeed are more vivacious in air than others ; the eel will live several hours out of water ; and the carp has been known to be fattened in a damp cellar. The method is by placing it in a net well wrapped up in wet moss, the mouth only out, and then hung up in a vault. The fish is fed with white bread and milk ; and the net now and then plunged into the water. The animal, thus managed, has been known not only to live for a fortnight, but to grow exceedingly fat, and of a superior flavour. From this it would seem that the want of a moisture in the gills is the chief cause of the death of these animals ; and could that be supplied, their lives might be prolonged in the air, almost as well as in their own element.

Yet it is impossible to account for the different operations of the same element, upon animals that, to appearance, have the same conformation. To some fishes, bred in the sea, fresh water is immediate destruction : on the other hand, some fishes, that live in our lakes and ponds, cannot bear the salt water. Whence this difference can arise, is not easily to be accounted for. The saline quality of the water cannot properly be given as the cause ; since no fishes imbibe any of the sea's saltness with their food, or in respiration. The flesh of all fishes is equally fresh, both in the river, and in the saltiest depths of the ocean ; the salt of the element in which they live no way mixing with their constitution. Whence then is it that animals will live only there, and will quickly expire when carried into fresh water ? It may probably arise from the superior weight of the sea-water ; as from the great quantity of salt dissolved in its composition, it is much heavier than fresh water, so it is pro-

bable it lies with greater force upon the organs of respiration, and gives them their proper and necessary play : on the other hand, those fish which are used only to fresh water, cannot bear the weight of the saline fluid, and expire in a manner suffocated in the grossness of the strange element.

But though there are some tribes that live only in the sea, and others only in fresh water, yet there are some whose organs are equally adapted to either element ; and that spend a part of their season in one, and a part in the other. Thus the salmon, the shad, the smelt, and the flounder, annually quit their native ocean, and come up our rivers to deposit their spawn. This seems the most important business of their lives ; and there is no danger which they will not encounter, even to the surmounting precipices, to find a proper place for the deposition of their future offspring. The salmon, upon these occasions, is seen to ascend rivers five hundred miles from the sea ; and to brave not only the danger of various enemies, but also to spring up cataracts as high as a house. As soon as they come to the bottom of the torrent, they seem disappointed to meet the obstruction, and swim some paces back : they then take a view of the danger that lies before them, survey it motionless for some minutes, advance, and again retreat ; till at last summoning up all their force, they take a leap from the bottom, their body straight, and strongly in motion ; and thus most frequently clear every obstruction. It sometimes happens, however, that they want strength to make the leap ; and then, in our fisheries, they are taken in their descent. But this is one of the smallest dangers that attend these adventuring animals in their progress : numberless are the methods of taking them ; as well by the hook, as by nets, baskets, and other inventions, which it is not our business here to describe. Their capture makes, in several countries, a great article of commerce ; and being cured in several different manners, either by salting, pickling, or drying, they are sent to all the markets of Europe.

As these mount up the rivers to deposit their spawn, others, particularly the eel, descend the fresh water stream, as Redi assures us, to bring forth their young in the sea. About the month of August, annually, these animals take the opportunity of the most obscure nights, and when the rivers are flooded by accidental rains seek the ocean. When they have reached the sea, and

produced their young, for they are viviparous, they again ascend the stream, at different times, as opportunity offers, or as the season is favourable or tempestuous. Their passage begins usually about the end of January, and continues till towards the end of May, when they are taken in the river Arno by millions, and so small that a thousand of them goes to a pound. There is nothing more certain than that they descend our own rivers after floods in great abundance, and are thus caught in nets to very great advantage. They are possessed also of a power of climbing over any obstacle ; for, by applying their glutinous and slimy bodies to the surface of the object they desire to surmount, they can thus creep up locks, weirs, and every thing that would prevent their ascending the current of the stream.

But the length of the voyage performed by these fishes, is short, if compared to what is annually undertaken by some tribes, that constantly reside in the ocean. These are known to take a course of three or four thousand miles in a season, serving for prey to whales, sharks, and the numerous flocks of water-fowl, that regularly wait to intercept their progress. These may be called fish of passage, and bear a strong analogy to birds of passage, both from their social disposition, and the immensity of their numbers. Of this kind are the cod, the haddock, the whiting, the mackarel, the tunny, the herring, and the pilchard. Other fish live in our vicinity, and reside on our coasts all the year round ; or keep in the depths of the ocean, and are but seldom seen : but these, at stated seasons, visit their accustomed haunts with regular certainty, generally returning the same week in the succeeding year, and often the same day.

The stated returns, and the regular progress of these fish of passage, is one of the most extraordinary circumstances in all the history of nature. What it is that impels them to such distant voyages ; what directs their passage ; and what supports them by the way ; and what sometimes prompts them to quit, for several seasons, one shore for another, and then return to their accustomed harbour ; are questions that curiosity may ask, but philosophy can hardly resolve. We must dismiss inquiry, satisfied with the certainty of the facts.

The cod seems to be the foremost of this wandering tribe, and is only found in our northern part of the world. This animal's chief place of resort is on the banks of Newfoundland, and the

other sand-banks that lie off Cape Breton. That extensive flat seems to be no other than the broad top of a sea-mountain, extending for above five hundred miles long, and surrounded with a deeper sea. Hither the cod annually repair in numbers beyond the power of calculation, to feed on the quantity of worms that are to be found there in the sandy bottom. Here they are taken in such quantities, that they supply all Europe with a considerable share of provision. The English have stages erected all along the shore for salting and drying them; and the fishermen, who take them with the hook and line, which is their method, draw them in as fast as they can throw out. This immense capture, however, makes but a very small diminution, when compared to their numbers; and when their provision there is exhausted, or the season for propagation returns, they go off to the polar seas, where they deposit their roes in full security. From thence want of food forces them, as soon as the first more southern seas are open, to repair southward for subsistence. Nor is this fish an unfrequent visitant upon our own shores: but the returns are not so regular, nor does the capture bear any proportion to that at Newfoundland.

The haddock, the whiting, and the mackarel,* are thought by

* Nearly all the species of mackarel are gregarious, and unite in immense shoals. Some of them are migratory, making long voyages at certain seasons of the year. It is believed that they are all eatable; and some of them are well known to be exceedingly delicate food. They afford employment and support to numerous fishermen in various countries of Europe. They are in the whole about twenty-five species.

The mackarel, when alive, from the elegance of its shape, and the brilliancy of its colours, is one of the most beautiful fish that frequents our coasts. Death, in some measure, impairs the colours, but it by no means obliterates them.

It visits our shores in vast shoals; but, from being very tender and unfit for long carriage, is found less useful than other gregarious fish. In some places it is taken by lines from boats, as during a fresh gale of wind it readily seizes a bait. It is necessary that the boat should be in motion, in order to drag the bait along (a bit of red cloth, or a piece of the tail of a mackarel,) near the surface of the water. The great fishery for mackarel is on some parts of the west coast of England. This is of such an extent as to employ, in the whole, a capital of nearly £200,000. The fishermen go out to the distance of several leagues from the shore, and stretch their nets, which are sometimes several miles in extent, across the tide, during the night. The meshes of these nets are just large enough to admit the heads of tolerably large fish, and catch them by the gills. A single boat has been known to bring in, after one night's fishing, a cargo that has sold for nearly seventy

some to be driven upon our coasts rather by their fears than their appetites; and it is to the pursuit of the larger fishes we owe their welcome visits. It is much more probable, that they come for that food which is found in more plenty near the shore than farther out at sea. One thing is remarkable, that their migrations seem to be regularly conducted. The grand shoal of haddocks that comes periodically on the Yorkshire coasts, appeared there in a body on the tenth of December, 1766; and exactly on the same day in the following year. This shoal extended from the shore near three miles in breadth, and in length for more than forty. The limits of a shoal are precisely known; for if the fishermen put down their lines at the distance of more than three miles from shore, they catch nothing but dog-fish: a proof that the haddock is not three.

But of all migrating fish, the herring and the pilchard take the most adventurous voyages. Herrings are found in the greatest abundance in the highest northern latitudes. In those inac-

pounds. Besides these there is another mode of fishing for mackarel, in the west of England, with a *ground-seine*. A roll of rope of about two hundred fathoms in length, with the net fastened to the end, is tied at the other to a post or rock on the shore. The boat is then rowed to the extremity of this coil, when a pole fixed there, leaded heavily at the bottom, is thrown overboard. The rowers from hence make, as nearly as possible, a semicircle, two men continually and regularly putting the net into the water. When they come to the other end of the net, where there is another leaded pole, they throw that overboard. Another coil of rope, similar to the first, is by degrees thrown into the water, as the boatmen make for the shore. The boat's crew now land, and with the assistance of persons stationed there, haul in each end of the net till they come to the two poles. The boat is then again pushed off towards the centre of the net, in order to prevent the more vigorous fish from leaping over the corks. By these means three or four hundred fish are often caught at one haul.

Mackarel are said to be fond of human flesh. Pontoppidon informs us, that a sailor, belonging to a ship lying in one of the harbours on the coast of Norway, went into the water to wash himself, when he was suddenly missed by his companions. In the course of a few minutes, however, he was seen on the surface, with vast numbers of these fish fastened on him. The people went in a boat to his assistance; and though, when they got him up, they forced with some difficulty the fishes from him, they found it was too late; for the poor fellow shortly afterwards expired.

The roes of the mackarel are used in the Mediterranean for caviar. The blood and slime are first washed off with vinegar, and the sinews and skinny parts taken away. They are then spread out for a short time to dry, and afterwards salted and hung up in a net, to drain some of the remaining moisture from them. When this is finished they are laid in a kind of sieve, until they are thoroughly dry, and fit for use.

cessible seas, that are covered with ice for a great part of the year, the herring and pilchard find a quiet and sure retreat from all their numerous enemies : thither neither man, nor their still more destructive enemy, the fin-fish, or the cachalot, dares to pursue them. The quantity of insect food which those seas supply, is very great ; whence, in that remote situation, defended by the icy rigour of the climate, they live at ease, and multiply beyond expression. From this most desirable retreat, Anderson supposes they would never depart, but that their numbers render it necessary for them to migrate ; and, as with bees from a hive, they are compelled to seek for other retreats.

For this reason, the great colony is seen to set out from the icy sea about the middle of winter ; composed of numbers, that if all the men in the world were to be loaded with herrings, they would not carry the thousandth part away. But they no sooner leave their retreats, but millions of enemies appear to thin their squadrons. The fin-fish and the cachalot swallow barrels at a yawn ; the porpoise, the grampus, the shark, and the whole numerous tribe of dog-fish, find them an easy prey, and desist from making war upon each other ; but, still more, the unnumbered flocks of sea-fowl, that chiefly inhabit near the pole, watch the outset of their dangerous migration, and spread extensive ruin.

In this exigence the defenceless emigrants find no other safety but by crowding closer together, and leaving to the outmost bands the danger of being first devoured ; thus, like sheep when frightened, that always run together in a body, and each finding some protection in being but one of many that are equally liable to invasion, they are seen to separate into shoals, one body of which moves to the west, and pours down along the coasts of America, as far as south Carolina, and but seldom farther. In Chesapeak Bay, the annual inundation of these fish is so great, that they cover the shores in such quantities as to become a nuisance. Those that hold more to the east, and come down towards Europe, endeavour to save themselves from their merciless pursuers, by approaching the first shore they can find ; and that which first offers in their descent, is the coast of Iceland, in the beginning of March. Upon their arrival on that coast, their phalanx, which has already suffered considerable diminutions, is, nevertheless, of amazing extent, depth, and closeness, covering an extent of shore as large as the island itself. The whole

water seems alive ; and is seen so black with them to a great distance, that the number seems inexhaustible. There the porpoise and the shark continue their depredations ; and the birds devour what quantities they please. By these enemies the herrings are cooped up into so close a body, that a shovel, or any hollow vessel, put into the water, takes them up without farther trouble.

That body which comes upon our coasts, begins to appear off the Shetland Isles in April. These are the forerunners of the grand shoal which descends in June ; while its arrival is easily announced, by the number of its greedy attendants, the gannet, the gull, the shark, and the porpoise. When the main body is arrived, its breadth and depth is such as to alter the very appearance of the ocean. It is divided into distinct columns, of five or six miles in length, and three or four broad ; while the water before them curls up, as if forced out of its bed. Sometimes they sink for the space of ten or fifteen minutes, then rise again to the surface ; and, in bright weather, reflect a variety of splendid colours, like a field bespangled with purple, gold, and azure. The fishermen are ready prepared to give them a proper reception ; and, by nets made for the occasion, they take sometimes above two thousand barrels at a single draught.

From the Shetland Isles, another body of this great army, where it divides, goes off to the western coasts of Ireland, where they meet with a second necessity of dividing. The one takes to the Atlantic, where it is soon lost in that extensive ocean ; the other passes into the Irish sea, and furnishes a very considerable capture to the natives.

In this manner the herrings, expelled from their native seas, seek those bays and shores where they can find food, and the best defence against their unmerciful pursuers of the deep. In general, the most inhabited shores are the places where the larger animals of the deep are least fond of pursuing ; and these are chosen by the herrings as an asylum from great dangers. Thus, along the coasts of Norway, the German shores, and the northern shores of France, these animals are found punctual in their visitations. In these different places they produce their young ; which, when come to some degree of maturity, attend the general motions. After the destruction of such numbers, the quan-

tity that attempts to return is but small ; and Anderson doubts whether they ever return.

Such is the account given of the migration of these fishes, by one who, of all others, was best acquainted with their history and yet many doubts arise, in every part of the migration. The most obvious which has been made is, that though such numbers perish in their descent from the north, yet, in comparison to those that survive, the account is trifling : and it is supposed, that of those taken by man, the proportion is not one to a million. Their regularly leaving the shore also at a stated time, would imply that they are not in these visits under the impulse of necessity. In fact, there seems one circumstance that shows these animals governed by a choice with respect to the shores they pitch upon ; and not blindly drove from one shore to another. What I mean, is their fixing upon some shores for several seasons, or, indeed, for several ages together ; and, after having regularly visited them every year, then capriciously forsaking them, never more to return. The first great bank for herrings was along the shores of Norway. Before the year 1584, the number of ships from all parts of Europe that resorted to that shore exceeded some thousands. The quantity of herrings that were then assembled there was such, that a man who should put a spear in the water, as Olaus Magnus asserts, would see it stand on end, being prevented from falling. But soon after that period, these animals were seen to desert the Norway shores, and took up along the German coast, where the Hanse-Towns drove a very great trade by their capture and sale ; but, for above a century, the herrings have, in a great measure forsaken them ; and their greatest colonies are seen in the British Channel, and upon the Irish shores. It is not easy to assign a cause for this seemingly capricious desertion : whether the number of their finny enemies, increasing along the northern coasts, may have terrified the herring tribe from their former places of resort ; or, whether the quantity of food being greater in the British Channel, may not allure them thither ; is not easy to determine.*

* Herrings prefer the deep water, and, generally speaking, avoid the shoal coasts ; and when they do get entangled upon one, great numbers are wrecked. The rocky promontory at the east end of the county of Fife, off which there lies an extensive reef or rock, sometimes has that effect ; and there have been seas in which, when the difficulties of the place were aug-

The pilchard, which is a fish differing little from the herring, makes the coast of Cornwall its place of principal resort. Their arrival on that coast is soon proclaimed by their attendants the birds and the larger fishes; and the whole country prepare to

mented by a strong wind at south-east, that carried breakers upon the reef and a heavy surf along the shore, the beach for many miles has been covered with a bank of herrings several feet in depth, which, if taken and salted when first left by the tide, would have been worth many thousands of pounds; but which, as there was not a sufficient supply of salt in the neighbourhood, were allowed to remain putrefying upon the beach, until the farmers found leisure to cart them away as manure. The herring is a remarkably delicate fish, and dies almost the instant that it is out of the water, or gets the slightest injury in it; and these circumstances, while they render the stranded shoals a much more frequent, abundant, and easy prey, than if they were more tenacious of life, cause them to putrefy much sooner. One of those strandings took place in and around the harbour of the small town of Crail only a few years ago, but before the new regulations were passed with regard to salt. The water appeared at first so full of herrings, that half-a-dozen could be taken by one dip of a basket. Numbers of people thronged to the water's edge and fished with great success; and the public crier was sent through the town, to proclaim that "eallar herrin'"—that is, herrings fresh out of the sea—might be had at the rate of forty a penny. As the water rose the fish accumulated, till numbers were stunned, and the rising tide was bordered with fish, with which baskets could be filled in an instant. The crier was upon this instructed to alter his note, and the people were invited to repair to the shore and get herrings at one shilling a cart load. But every successive wave of the flood added to the mass of fish, and brought it nearer to the land, which caused a fresh invitation to whoever might be inclined to come and take what herrings they chose gratis. The fish still continued to accumulate till the height of the flood; and when the water began to ebb, they remained on the beach. It was rather early in the season, so that warm weather might be expected; and the effluvia of so many putrid fish might occasion disease; therefore the corporation offered a reward of one shilling to every one who would remove a full cart load of herrings from that part of the shore which was under their jurisdiction:—the fish being immediately from the deep water, were in the highest condition, and barely dead. All the salt from the town and neighbourhood was instantly put in requisition; but it did not suffice for the thousandth part of the mass—a great proportion of which, notwithstanding some not very successful attempts to carry off a few sloop loads in bulk, was lost. In the bays or "lochs," on the west coast of Scotland, where the shoals of herrings are very abundant, and apt to be driven ashore and stranded by heavy gales from the north-west, these casualties often occur. But though these occurrences are a great and obvious loss, they do not appear to have any effect upon the supply of herrings, whose numbers do not seem capable of apparent diminution, either by the casualties of nature or the schemes of art. The habits of this most abundant, and, perhaps, all things considered, most valuable fish, are but imperfectly known; and they have been a good deal misrepresented. Their apparently capricious visita

take the advantage of this treasure, providentially thrown before them. The natives sometimes enclose a bay of several miles extent with their nets called *saines*. To direct them in their operations, there were some years ago (but I believe they

to particular parts of the coast, which did not seem to depend upon any known law, naturally enough led the inhabitants of the places which they thus periodically, but irregularly, visited, to impute to them certain superstitious likes and dislikes. The naturalists, too, or those who took upon themselves that character, publishing their opinions from little observation and less reflection, rendered the delusion more extensive and inveterate; till those who had never seen a live herring, were able to trace its migrations in the deep with as much certainty as they could the motion of the hands upon the dial of the village clock.

The herrings do not come in myriads from the Polar Sea, beginning their progress in January, because there are no means of producing them there. Spawn has not been found to animate in any place except floating near the surface, or in shallow water, where both the sun and the air act upon it; and while the Polar Seas and shores are open to such action, the herrings are not there; they are on our shores, the full-grown and the young. But setting aside the impossibility, the supposed emigration would be without an object; they would not come for food, as they are said to leave the north just when food would be found there! and if they are annually produced in the north, they could not come to our shores for the purpose of spawning, even though they are all obviously in preparation for such a purpose. Beside, there is no animal that migrates southward in the spring, and therefore the theory would require one law for the rest of creation, and another for the herring—that the latter should be chilled by the general warmth of the spring, and warmed by the Polar frost, now, so far is the production of fish from being independent of the influence of heat, that, just as we would be led to infer from the slow progress of the solar beams through the element in which they live, they require the whole, or the greater part of our summer, to mature the germs of their countless broods. Nay, it appears that many, if not most of the species, cannot mature their spawn in the depths of the ocean, to which they retire to recruit their strength; but that they come to the shores and shallows, where the heat of the sun can penetrate to the bottom, and be reflected by it, for the purpose of maturing as well as of depositing their spawn. We know not, and we cannot know, the secrets of those mighty depths which no plummet can fathom; but we have every reason to believe that there is a profundity where animals, constructed as the fishes that we see are, could not by possibility exist. Imagine the pressure of a thousand atmospheres, or between six and seven tons, upon every square inch of surface, and think of the miracle of muscular power which could give motion even to the smallest fish there; imagine, too, a permanence of state where the air never moves, and the sun never warms; and think what a dwelling for that which must breathe by an apparatus so delicate as the gills of a fish! It may be said, that God is capable of making creatures adapted for living there. We do not deny that he is, neither do we deny their existence; but we deny that the laws of nature are ever violated, which they would be, were the fishes which we know able to move under such a pressure, or

are discontinued) several men placed on eminences near the shore, called *huers*, who, with brooms in their hands, gave signals where the nets were to be extended, and where the shoals of fishes lay: this they perceived by the colour of the water, which assumed a tincture from the shoals beneath. By these

propagate, so completely excluded from the action of the sun and the air. The herrings come to the shores and estuaries to mature and propagate their spawn, which they do over a greater range of the year than most other fish, continuing the operation to the middle of winter, and retiring into deeper water after that is done. But there is no reason to conclude that they have much migration in latitude, or that they ever move far from those shores which they frequent in the season. The fry too are found on the shores and in the bays and estuaries frequented by their parents; and they do not go to the deep water till late in the season. They even appear to go farther up the rivers than the old fish, for they may be taken in brackish water with a common trout-fly. The habits of the herring are thus a good deal like those of the salmon; and it is probable that there is a great similarity in the whole *oviparous* fishes; that they all frequent the banks and shoals for the purpose of spawning, and go to some short distance in deeper water to recover their strength. Those which are *viviparous*, or bring forth their young hatched, are under no such necessity; though they follow the others to feed upon them and their spawn or fry, and probably require the influence of the air and heat of the shallow water to perfect the internal hatching of their eggs. It has not been ascertained whether any of these fish spawn every year; but there are some facts which would lead to the conclusion that they do not. The white-fishing, on the east coast of Scotland, which is principally carried on for the common cod (*morhua vulgaris*), and the haddock (*morhua æglifinus*), used to be in a great measure suspended during the spring, when the fish had spawned; but in time, the fisherman found out, that when the fish were neither plentiful nor good upon the shallow banks, they had only to be a little more adventurous, and go into the deep water, in order to be successful all the year round. Now the fish found in the deep water cannot be those which have just spawned, for they are fat and firm, and have young milts and roes in them; and hence there is some probability that the cod, and other fish of the same structure, take two years or more to produce their immense progeny; and that thus there is not a fish in the sea but which is in season all the year, if its place of residence and the mode of taking it were known. It is by these general views that the particular facts are made to connect themselves with the system of nature, and lead to useful discoveries in the arts. When the fish are upon the shores and in the estuaries, nay, when they are upon the wide ocean, they have a host of enemies. All fishes seem to be themselves *omnivorous*—consuming every thing that they can swallow; and the number of sea-birds is perfectly incredible. The numbers that are upon the uninhabited islets in Orkney, Shetland, and the western isles, as well as at those inaccessible promontories on other parts of the coast, would exceed the belief of any one who has not actually seen them, and yet they are nothing to the numbers found in lonely places, surrounded by more extensive seas.

means, they sometimes take twelve or fifteen hundred barrels of pilchards at a draught; and they place them in heaps on the shore.—It often happens that the quantity caught exceeds the salt or the utensils for curing them; and they then are carried off to serve for the purposes of manure. This fishery employs not only great numbers of men at sea, training them to naval affairs, but also numbers of women and children at land, in salting and curing the fish; in making boats, nets, ropes, and casks, for the purposes of taking or fitting them for sale. The poor are fed with the superfluity of the capture; the land is manured with the offals; the merchant finds the gain of commission, and honest commerce; the fisherman a comfortable subsistence from his toil. “Ships,” says Dr Borlase, “are often freighted hither with salt, and into foreign countries with the fish, carrying off at the same time a part of our tin. The usual produce of the number of hogsheads exported for ten years, from 1747 to 1756 inclusive, amounted to nearly thirty thousand hogsheads each year; every hogshead has amounted, upon an average, to the price of one pound thirteen shillings and threepence. Thus the money paid for pilchards exported, has annually amounted to near fifty thousand pounds.”

Whence these infinite numbers are derived, still remains obscure; but it will increase our wonder to be told, that so small a fish as the stickleback, which is seldom above two inches long, and that one would think could easily find support in any water, is yet obliged to colonize, and leave its native fens in search of new habitations. Once every seventh or eighth year, amazing shoals of these appear in the river Welland, near Spalding, and come up the stream, forming one great column. There are supposed to be multitudes collected in some of the fens, till overcharged with numbers, they are periodically obliged to migrate. An idea may be had of their numbers, when we are informed, that a man, employed by a farmer to take them, for the purpose of manuring his grounds, has got, for a considerable time, four shillings a day by selling them at a halfpenny a bushel!

Thus we see the amazing propagation of fishes along our own coasts and rivers; but their numbers bear no proportion to the vast quantities found among the islands of the Indian ocean. The inhabitants of these countries are not under the necessity even of providing instruments for fishing; it is but going down

to the shore, and there the fish are found in great numbers in the plashees that still continue to have water in them. In some of these places the quantity is so great that they are left in shoals on those swamps, dried up by the sun, and their putrefaction contributes to render the country unhealthful.

This power of increasing in these animals, exceeds our ideas, as it would in a very short time outstrip all calculation. A single herring, if suffered to multiply unmolested and undiminished for twenty years, would show a progeny greater in bulk than ten such globes as that we live upon. But happily the balance of Nature is exactly preserved; and their consumption is equal to their fecundity. For this reason we are to consider the porpoise, the shark, or the cod-fish, not in the light of plunderers and rivals, but of benefactors to mankind. Without their assistance, the sea would soon become overcharged with the burden of its own productions; and that element, which at present distributes health and plenty to the shore, would but load it with putrefaction.

In the propagation of all fish, some degree of warmth seems absolutely necessary, not only to their preservation, but to the advancement of their posterity. Their spawn is always deposited in those places where the sun beams may reach them, either at the bottom of shallow shores, or floating on the surface in deeper waters. A small degree of heat answers all the purposes of incubation, and the animal issues from the egg in its state of perfect formation, never to undergo any succeeding change.

Yet, still I have some doubts whether most fish come from the egg completely formed. We know that in all the frog tribe, and many of the lizard kind, they are produced from the egg in an imperfect form. The tadpole, or young frog, with its enormous head and slender tail, are well known; a species of the lizard also, which is excluded from the shell without legs, only acquires them by degrees, and not till after some time does it put off its serpent form. It is probable that some kinds of fish in like manner suffer a change; and though it be too inconsiderable to strike the fisherman or the inattentive spectator, yet it makes a very material difference to the naturalist, and would, perhaps, disarrange his most favourite systems. A slight alteration in the fins or bones that cover the gills would overturn the whole fabric of the most applauded ichthyologist; and yet, as I observed,

it is most probable that these minute alterations often take place.

As a proof of this, during the month of July, there appear near Greenwich, innumerable shoals of small fishes, which are known to the Londoners by the name of White bait. It is universally agreed that they are the young of some fish; they are never seen but at this time of the year, and never found to have any roe, a circumstance that proves their not being come to maturity. The quantity is amazing; and the fish that produces them in such numbers must be in plenty, though it is not yet known what that fish is, as they correspond with no other species whatever. They most resemble the smelt in form; and yet they want a fin which that animal is never without. They cannot be the bleak, as they are never found in other rivers where the bleak breed in great abundance. It is most probable, therefore, that they are the young of some animal not yet come to their perfect form, and therefore reducible to no present system.

The time that spinous fishes continue in the pea is in proportion to the size of the kind. It is a rule that chiefly holds through nature, that the larger the animals are, the longer they continue before exclusion. This I say holds generally through all nature, though it is not easy to assign a cause for so well known a truth. It may probably be, that as all large bodies take a longer time to grow hot than small ones, so the larger the egg, the longer influence of vital warmth it requires to reach through all its recesses, and to unfold the dormant springs that wait to be put into motion.

The manner in which the eggs of fishes are impregnated is wholly unknown. All that obviously offers is, that in ponds the sexes are often seen together among the long grass at the edge of the water; that there they seem to struggle; and that during this time they are in a state of suffering; they grow thin; they lose their appetite, and their flesh becomes flabby; the scales of some grow rough, and they lose their lustre. On the contrary, when the time of coupling is over, their appetite returns; they re-assume their natural agility, and their scales become brilliant and beautiful.

Although the usual way with spinous fishes is to produce by spawn; yet there are some, such as the eel and the blenny, that are known to bring forth their young alive. Bowlker, who has

written a treatise upon fishing, seems to determine the question relative to the viviparous production of eels, upon the authority of one or two credible witnesses. An eel, opened in the presence of several persons of credit, was found to have an infinite number of little creatures, closely wrapped up together in a lump, about the size of a nutmeg, which being put into a basin of water, soon separated, and swam about : yet still, whether these may not have been worms generated in the animal's body, remains a doubt ; for there are scarcely any fishes that are not infested with worms in that manner. ¹

With respect to the growth of fishes, it is observed, that among carps, particularly the first year, they grow to about the size of the leaf of a willow-tree ; at two years, they are about four inches long. They grow but one inch more the third season, which is five inches. Those of four years old are about six inches ; and seven after the fifth. From that to eight years old they are found to be large in proportion to the goodness of the pond, from eight to twelve inches. With regard to sea-fish, the fishermen assure us, that a fish must be six years old before it is fit to be served up to table. They instance it in the growth of a mackarel. They assure us that those of a year old are as large as one's finger ; that those of two years, are about twice that length ; at three and four years, they are that small kind of mackarel that have neither milts nor roes ; and between five and six, they are those full-grown fish that are served up to our tables. In the same manner, with regard to flat fishes, they tell us, that the turbot and barbel at one year are about the size of a crown-piece ; the second year, as large as the palm of one's hand ; and at the fifth and sixth year, they are large enough to be served up to table. Thus it appears, that fish are a considerable time in coming to their full growth, and that they are a long time destroyed before it comes to their turn to be destroyers. ²

All fish live upon each other in some state of their existence. Those with the largest mouths attack and devour the larger

¹ The Eel, it is known, is viviparous. It produces its numerous young during the decline of summer : these are very small at their first exclusion. This fish often wanders about meadows in search of snails and other food ; and, according to Dr Anderson, young eels will often migrate across the land, in great shoals, from one part of a river to another.

² *Traité des Pêches*, par Monsieur Duhamel. Sect. 3. p. 100.

kinds ; those whose mouths are less, lie in wait for the smaller fry ; and even these chiefly subsist upon spawn. Of those which live in the ocean, of the spinous kinds, the dorado is the most voracious. This is chiefly found in the tropical climates ; and is at once the most active and the most beautiful of the finny region. It is about six feet long ; the back all over enamelled with spots of a blueish green and silver ; the tail and fins of a gold colour ; and all have a brilliancy of tint, that nothing but nature's pencil can attain to : the eyes are placed on each side of the head, large and beautiful, surrounded with circles of shining gold. In the seas where they are found, these fish are always in motion, and play round ships in full sail with ease and security : for ever either pursuing or pursued, they are seen continually in a state of warfare ; either defending themselves against the shark, or darting after the smaller fishes. Of all others, the Flying-fish most abounds in these seas ; and as it is a small animal, seldom growing above the size of a herring, it is chiefly sought by the dorado. Nature has furnished each respectively with the powers of pursuit and evasion. The dorado being above six feet long, yet not thicker than a salmon, and furnished with a full compliment of fins, cuts its way through the water with amazing rapidity : on the other hand, the flying-fish is furnished with two pair of fins longer than the body, and these also moved by a stronger set of muscles than any other. This equality of power seems to furnish one of the most entertaining spectacles those seas can exhibit. The efforts to seize on the one side, and the arts of escaping on the other, are perfectly amusing. The dorado is seen, upon this occasion, darting after its prey, which will not leave the water, while it has the advantage of swimming, in the beginning of the chase. But, like a hunted hare, being tired at last, it then has recourse to another expedient for safety by flight. The long fins, which began to grow useless in the water, are now exerted in a different manner, and different direction, to that in which they were employed in swimming : by this means, the timid little animal rises from the water, and flutters over its surface for two or three hundred yards, till the muscles employed in moving the wings are enfeebled by that particular manner of exertion. By this time however, they have acquired a fresh power of renewing their efforts in the water, and the animal is capable of proceeding with

some velocity by swimming: still, however, the active enemy keeps it in view, and drives it again from the deep; till, at length, the poor little creature is seen to dart to shorter distances, to flutter with greater effort, and to drop down at last into the mouth of its fierce pursuer. But not the dorado alone, all animated nature seems combined against this little fish, which seems possessed of double powers, only to be subject to greater dangers. For though it should escape from its enemies of the deep, yet the tropic bird, and the albatross are for ever upon the wing to seize it. Thus pursued in either element, it sometimes seeks refuge from a new enemy; and it is not unfrequent for whole shoals of them to fall on shipboard, where they furnish man with an object of useless curiosity.

The warfare in fresh water is not carried on with such destructive activity; nor are the inhabitants of that element so numerous. It would seem that there is something more favourable to the fecundity of fishes in the ocean than in an element less impregnated with salt. It has been the opinion of some philosophers that all fish are natives of that great reservoir; and that only colonies have been sent up rivers, either through accident, or the necessity of procuring subsistence. They have been led to this opinion by the superior fecundity of sea-fish, which breed twenty to one; as well as by their superiority in strength and size, over those of the same kind found in lakes and rivers. This is a matter too remotely speculative to be worth pursuing; but certain it is that, in fresh water, fishes seem to abate much of their courage and rapacity; pursue each other with less violence, and seem to be less powerfully actuated by all their appetites. The greediness with which sea-fish devour the bait is prodigious, if compared with the manner they take it in fresh water. The lines of such fishermen as go off to sea are coarse, thick, and clumsy, compared to what are used by those who fish at land. Their baits are seldom more than a piece of a fish, or the flesh of some quadruped, stuck on the hook in a bungling manner; and scarcely any art is employed to conceal the deception. But it is otherwise in fresh water: the lines must often be drawn to a hair-like fineness; they must be tinctured of the peculiar colour of the stream; the bait must be formed with the nicest art, and even, if possible, to exceed the perfection of nature: yet still the fishes approach it with diffidence, and often

swim round it with disdain. The cod, on the banks of Newfoundland, the instant the hook, which is only baited with the guts of the animal last taken, is dropped into the water, darts to it at once, and the fishermen have but to pull up as fast as they throw down. But it is otherwise with those who fish in fresh waters, they must wait whole hours in fruitless expectation ; and *the patience of a fisherman* is proverbial among us.

This comparative neglect of food, which is found in all the tribes of fresh-water fishes, renders them less turbulent and less destructive among each other. Of all these the pike is the most active and voracious ; and our poets, whose business it is to observe the surface of nature, have called it the tyrant of the watery plain. In fact, in proportion to its strength and celerity, the pike does some mischief ; but what are its effects compared to those of the cachalot or the shark ! they resemble the petty depredations of a robber, put in competition with the ravages of a conqueror ! However, the pike will attack every fish less than itself ; and it is sometimes seen choked, by attempting to swallow such as are too large a morsel. It is immaterial of what species the animal it pursues appears to be, whether of another or its own, all are indiscriminately devoured ; so that every fish owes its safety to its minuteness, its celerity, or its courage : nor does the pike confine itself to feed on fish and frogs ; it will draw down the water-rat and the young ducks, as they are swimming about. Gesner tells us of a mule that stooped to drink in the water, when a famished pike, that was near, seized it by the nose, nor was it disengaged till the beast flung it on shore. So great is their rapacity, that they will contend with the otter for his prey, and even endeavour to force it from him. For this reason it is dreaded by all other fish : and the small ones show the same uneasiness and detestation at the presence of their tyrant, as the little birds do at the sight of a hawk or an owl. When the pike lies asleep near the surface, as is frequently the case, the lesser fish are often observed to swim around it in vast numbers, with a mixture of caution and terror.

The other tribes of fresh-water fish are much inferior to this animal in courage and rapacity : they chiefly subsist upon worms and insects, pursuing them at the bottom, or jumping after them to the surface of the water. In winter also, their appetite seems entirely to forsake them ; at least they continue in so torpid a

state, that few baits will tempt them to their destruction. At that season, they forsake the shallow waters, and seek those deep holes to be found in every river, where they continue for days together, without ever appearing to move. The cold seems to affect them ; for at that time they lie close to the bottom, where the water is most warm, and seldom venture out, except the day be peculiarly fine, and the shallows at the edges of the stream become tepified by the powerful rays of the sun. Indeed, I have been assured, that some fishes may be rendered so torpid by the cold, in the northern rivers, as to be frozen up in the great masses of ice, in which they continue for several months together, seemingly without life or sensation, the prisoners of congelation, and waiting the approach of a warmer sun to restore them at once to life and liberty. Thus that cheerful luminary not only distributes health and vegetation to the productions of the earth, but is ardently sought even by the gelid inhabitants of the water.

As fish are enemies one to another, so each species is infested with worms of different kinds peculiar to itself. The great fish abound with them ; and the little ones are not entirely free. These troublesome vermin lodge themselves either in the jaws and the intestines internally, or near the fins without. When fish are healthy and fat they are not much annoyed by them ; but in winter, when they are lean or sickly, they then suffer very much.

Nor does the reputed longevity of this class secure them from their peculiar disorders. They are not only affected by too much cold, but there are frequently certain dispositions of the element in which they reside unfavourable to their health and propagation. Some ponds they will not breed in, however artfully disposed for supplying them with fresh recruits of water, as well as provision. In some seasons they are found to feel epidemic disorders, and are seen dead by the water side, without any apparent cause : yet still they are animals of all others the most vivacious, and they often live and subsist upon such substances as are poisonous to the more perfect classes of animated nature.

It is not easy to determine whether the poisonous qualities which many of them are found to possess, either when they wound our bodies externally with their spines, or when they are unwarily eaten at our tables, arises from this cause. That num-

bers of fishes inflict poisonous wounds, in the opinion of many, cannot be doubted. The concurrent testimony of mankind they think sufficient to contradict any reasonings upon this head, taken from anatomical inspection. The great pain that is felt from the sting given by the back fin of the weaver, bears no proportion to the smallness of the instrument that inflicts the wound. How the poison is preserved, or how it is conveyed by the animal, it is not in our power to perceive; but its actual existence has been often attested by painful experience. In this instance we must decline conjecture, satisfied with history.

The fact of their being poisonous when eaten, is equally notorious; and the cause equally inscrutable. My poor worthy friend, Dr Grainger, who resided for many years at St Christopher's, assured me, that of the fish caught, of the same kind, at one end of the island, some were the best and most wholesome in the world; while others taken at a different end were always dangerous, and most commonly fatal. We have a paper in the *Philosophical Transactions*, giving an account of the poisonous qualities of those found at New Providence, one of the Bahama islands. The author assures us, that the greatest part of the fish of that dreary coast are all of a deadly nature: their smallest effects being to bring on a terrible pain in the joints, which, if terminating favourably, leaves the patient without any appetite for several days after. It is not those of the most deformed figure, or the most frightful to look at, that are alone to be dreaded; all kinds, at different times, are alike dangerous; and the same species which has this day served for nourishment, is the next, if tried, found to be fatal!

This noxious quality has given rise to much speculation, and many conjectures. Some have supposed it to arise from the fishes on these shores eating of the manchineel apple, a deadly vegetable poison, that sometimes grows pendent over the sea: but the quantity of those trees growing in this manner, bears no proportion to the extensive infection of the fish. Labat has ascribed it to their eating the galley-fish, which is itself most potently poisonous: but this only removes our wonder a little farther back; for it may be asked, with as just a cause for curiosity, how comes the galley-fish itself to procure its noxious qualities? Others have ascribed the poison of these fishes to their feeding upon copperas-beds: but I do not know of any

copper-mines found in America. In short, as we cannot describe the alembic by which the rattlesnake distils its malignity, nor the process by which the scorpion, that lives among roses, converts their sweets to venom, so we cannot discover the manner by which fishes become thus dangerous; and it is well for us of Europe that we can thus wonder in security. It is certain that with us, if fishes, such as carp or tench, acquire any disagreeable flavour from the lakes in which they have been bred, this can be removed, by their being kept some time in finer and better water: there they soon clear away all those disagreeable qualities their flesh had contracted, and become as delicate as if they had been always fed in the most cleanly manner. But this expedient is with us rather the precaution of luxury than the effect of fear: we have nothing to dread from the noxious qualities of our fish; for all the animals our waters furnish are wholesome.

Happy England! where the sea furnishes an abundant and luxurious repast, and the fresh waters an innocent and harmless pastime; where the angler, in cheerful solitude, strolls by the edge of the stream, and fears neither the coiled snake, nor the lurking crocodile; where he can retire at night, with his few trouts (to borrow the pretty description of old Walton) to some friendly cottage, where the landlady is good, and the daughter innocent and beautiful; where the room is cleanly, with lavender in the sheets, and twenty ballads stuck about the wall! There he can enjoy the company of a talkative brother sportsman, have his trouts dressed for supper, tell tales, sing old tunes, or make a catch! There he can talk of the wonders of nature with learned admiration, or find some harmless sport to content him, and pass away a little time, without offence to God, or injury to man!

END OF VOLUME THIRD.

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